2008 Wildlife Program

Annual Report

Lake Tahoe Basin Management Unit

Ecosystem Conservation Department

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1.0 SPECIES ADDRESSED

Summary of 2008 Survey Effort and Results

- **California Spotted Owl:** 29 survey areas, 11 spotted owls (3 pairs, 5 individual adult males, and no juveniles), 7 territories, and no nests.
- **Northern goshawk:** 37 survey areas, 15 individual goshawks (14 adult detections, 1 juvenile) and 7 detections of evidence , 10 territories, 2 territories with reproductive activity, and 2 nests (that fledged 2 known juveniles).
- **Osprey:** 139 nest sites, 22 active nests, 10 nests that fledged young, and 20 fledglings.
- **Bald eagle:** 10 bald eagles (8 adults and 2 juvenile) during the mid-winter survey; one active nest, and 2 fledglings.
- **Golden eagle:** 1 non-protocol survey, 0 detections, and 0 nests.
- **Barred owl:** 1 survey area, 0 detections, and 0 nests.
- **Peregrine falcon:** 3 survey areas, 5 peregrine falcons (1 or 2 pairs), 2 territories, and no nests.
- **Willow flycatcher:** 11 sites, 7 adult flycatchers, 5 territories, 3 nests, and 8 fledglings with no known renests.
- **Small mammals:** 3 survey areas, 15 species trapped, and 160 individuals.
- **Bats:** 5 mines located, 3 surveyed for bats, 2 determined to have some bat presence, and 0 sensitive species detected.
- **Mountain beaver:** 2 watersheds surveyed and 35 territories detected.

The Ecosystem Conservation Department of the Lake Tahoe Basin Management Unit (LTBMU) and it's partners conducted surveys to assess presence/absence, reproductive activity and success, and spatial distribution of several prominent species of special interest for the Lake Tahoe Basin in 2008. These included California spotted owl (*Strix occidentalis occidentalis*), northern goshawk (*Accipiter gentilis*), osprey (*Pandion haliaetus*), bald eagle (*Haliaeetus leucocephalus*), golden eagle (*Aquila chrysaetos*), barred owl (*Strix varia*), peregrine falcon (*Falco peregrinus*), willow flycatcher (*Empidonax traillii*), and mountain beaver (*Aplodontia rufa*). Additionally, generalized small mammal and bat surveys were performed to gather baseline data, guide project work objectives, and follow up on detections from previous surveys.

1.1 CALIFORNIA SPOTTED OWL

1.1.1 BACKGROUND, PROTOCOL, AND SURVEY METHODS

The LTBMU conducted surveys for California spotted owl in cooperation with California Department of Parks and Recreation (CDPR), Nevada Department of Wildlife (NDOW), California Tahoe Conservancy (CTC), and Hauge Brueck Associates (contractor for Heavenly Mountain Resort) in 2008. We also coordinated with our neighboring Forests (the Eldorado, Tahoe, and Humboldt-Toiyabe National Forests). However, none of the neighboring forests conducted spotted owl surveys on or immediately adjacent to the LTBMU in 2008. All surveys for California spotted owl followed Forest Service, Region 5, 'Protocol for Surveying for Spotted Owls in Proposed Management Activity Areas and Habitat Conservation Areas' (USDA, revised 1993). Surveys for spotted owls determined survey area occupancy, individual and pair status,

nesting status, and reproductive success. Owl pairs were identified based on whether the detections occurred within ¼ mile of each other as described in the regional protocol. A territory is determined to be 'reproductive' if nesting activity was observed or if juveniles were detected during the field season. Fledging is verified when juveniles are detected outside the nest cavity.

The LTBMU and its partners surveyed 29 areas within the Lake Tahoe Basin for California spotted owl in 2008 (Appendix 1). Survey areas were established in highly suitable to marginally suitable habitats within ¼ mile of Forest Service project sites; including fuels treatment, habitat restoration, new bike trails and trail reroute projects (Table 1). LTBMU routes were surveyed three times, with the first two visits occurring prior to 30 June, per standard 2-year survey protocols. Nest checks were located mostly in areas that were slated for protocol spot calling surveys for 2008.

Table 1. Areas within the Lake Tahoe Basin surveyed for California spotted owl by the Lake Tahoe Basin Management Unit, CDPR, NDOW, and Hauge Brueck Associates in 2008. Occurrence of historical spotted owl detections near survey areas, number of visits in 2008, and LTBMU projects associated with survey area are also presented for reference.

Route Name	Historical Detections	2008 visits	Associated USFS Projects
Angora Creek	Yes	3	Angora Fire Long-term Restoration
Angora Ridge	Yes	3	Wildlife Monitoring, Fallen Leaf Lake Bike Trail, Angora Fire Long-term Restoration
Blackwood Canyon	Yes	3	Chemical Weed Control, Quail Fuel Reduction
Bliss Creek	No	3	Lake Tahoe Ecosystem Underburn Project
Burton FS	Yes	3	Wildlife Monitoring
Carnelian Bay	Yes	3	Wildlife Monitoring
Cold Creek Cold Creek nest	Yes	3	High Meadows Ecosystem Restoration, Aspen Habitat Restoration Project
Fallen Leaf Lake	Yes	3	Wildlife Monitoring, Fallen Leaf Lake Bike Trail, Aspen Habitat Restoration Project
Griff Creek	Yes	3	Wildlife Monitoring, Lake Tahoe Ecosystem Underburn Project
Heavenly Ski Resort (Hauge Brueck Assoc.)	No	3	Heavenly Mountain Resort Master Agreement
High Meadow	No	3	High Meadows Ecosystem Restoration
Logan House Creek	No	3	Lake Tahoe Ecosystem Underburn Project
Secret Harbor	No	3	East Shore Beaches
Martis Peak	Yes	3	Lake Tahoe Ecosystem Underburn Project
North Canyon (NDOW)	Yes	1	N/A
Page Meadows	Yes	3	Lake Tahoe Ecosystem Underburn Project
Round Hill	No	3	Nevada Beach Campground BMP Retrofit
Round Lake	Yes	3	Big Meadow Watershed Fire Regime Restoration
Saxon Creek	Yes	5	Wildlife Monitoring, Lake Tahoe Ecosystem Underburn Project
S. Lake Tahoe Airport	No	3	Upper Truckee River Restoration (multi-agency project)
Spring Creek	Yes	3	Fallen Leaf Lake Bike Trail
Sugar Pine Point State Park (CDPR)	Yes	1	Riparian Hardwoods Restoration and Enhancement Project (CDPR project)
Tahoe Mountain	Yes	3	Fallen Leaf Lake Bike Trail

Route Name	Historical Detections	2008 visits	Associated USFS Projects
Taylor Creek	No	3	Fallen Leaf Lake Bike Trail, Aspen Habitat Restoration Project
Twin Crags	Yes	3	Twin Crags Fuel Reduction
Ward Timber	Yes	3	Lake Tahoe Ecosystem Underburn Project
Washoe State Park (CDPR)	No	4	Lake Tahoe Golf Course Alternative 2

Each area was surveyed from an established route along roads and/or trails. Portion(s) of any survey route(s) within a one-mile radius of an active spotted owl nest were not surveyed for the remainder of the season. Survey efforts within a one-mile radius of the active nest focused directly on the nest stand.

Spot-calling surveys were conducted per protocol for California spotted owl from 15 April 2008 through 5 August 2008. Nest checks were conducted after April 15th but prior to the first survey at three south shore locations: Saxon Creek, Spring Creek, and Cold Creek. All are historic nest locations located near areas slated for project work within the next two years. Hauge Brueck Associates conducted surveys for spotted owls at Heavenly Ski Resort. Twelve call stations were called within the boundaries of the resort along with 18 call stations located on Nevada State Park and Forest Service lands around the northwestern perimeter of the resort. CDPR conducted a survey for spotted owls at Sugar Pine State Park, near LTBMU forest system lands. Two surveys in Sugar Pine State Park were conducted in 2008, during which a male and female spotted owl were detected. Additionally, NDOW conducted a spotted owl survey in North Canyon, between Spooner Lake and Marlette Lake.

Currently, there are 19 PACs within the LTBMU; 12 of the 19 PACs were surveyed this year for spotted owl due to the proximity of LTBMU project-implementation sites, or number of years passed since last surveyed. Twin Peaks, Stanford Rock, Painted Rock, Mount Pluto, Echo, Upper Saxon and Hellhole were not surveyed as projects were not scheduled to take place within the boundaries of the PACs or within close proximity (0.25 miles) during the breeding season.

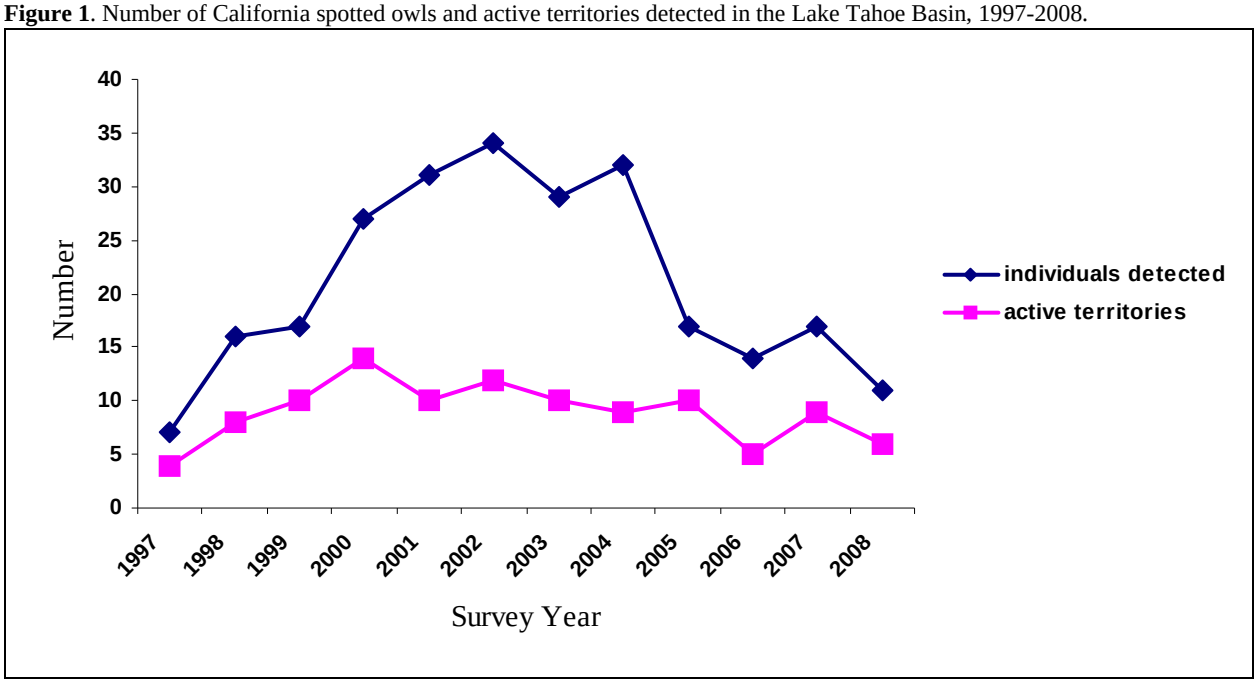
1.1.2 SURVEY RESULTS

Approximately 17,911acres (7,248 hectares) were surveyed for California spotted owl by the LTBMU and its partners in the Lake Tahoe Basin in 2008. Acreage was calculated based on the area encompassed within a one mile radius of nests and the average area effectively surveyed (0.25 mile radius) from call stations during spot-calling surveys. LTBMU wildlife crews surveyed 15,152 acres (6,132 hectares). CDPR surveyed 185 acres (75 hectares), which is a single call area, in Sugar Pine State Park. Hauge Brueck Associates surveyed 1,500 acres (607 hectares) at Heavenly Ski Resort. NDOW surveyed approximately 1,074 acres (434 hectares) between two survey routes along the east shore area of the Tahoe Basin. The LTBMU, CDPR, and Hauge Brueck Associates detected a total of 11 individual spotted owls in the Lake Tahoe Basin in 2008 (down 26% from 15 in 2007).

1.1.2.1 2008 Detections

Ten individual spotted owls were detected in 2008 (Figure 1): 3 pairs, 5 individual males, 1 individual female, and 0 juveniles.

Figure 1. Number of California spotted owls and active territories detected in the Lake Tahoe Basin, 1997-2008.



While seven territories had activity in 2008, three territories were determined to be active with current pairs (i.e. Saxon Creek, Sugar Pine, and Cold Creek areas). The California State Park's survey in Sugar Pine Point State Park detected a pair of spotted owls (male and female) during two surveys. Pairs were observed directly together at Saxon Creek, Cold Creek and Sugar Pine Point State Park at Lily Pond. Active territories decreased from nine in 2007 to three in 2008 (Figure 1). Juveniles observed to have fledged decreased from three in 2007 to zero this year. Breeding activity comparisons are shown in Figure 2 and, breeding and territory status for 2008 is summarized in Table 2 (see below).

Figure 2. California spotted owl reproductive activity in the Lake Tahoe Basin, 1997-2008.

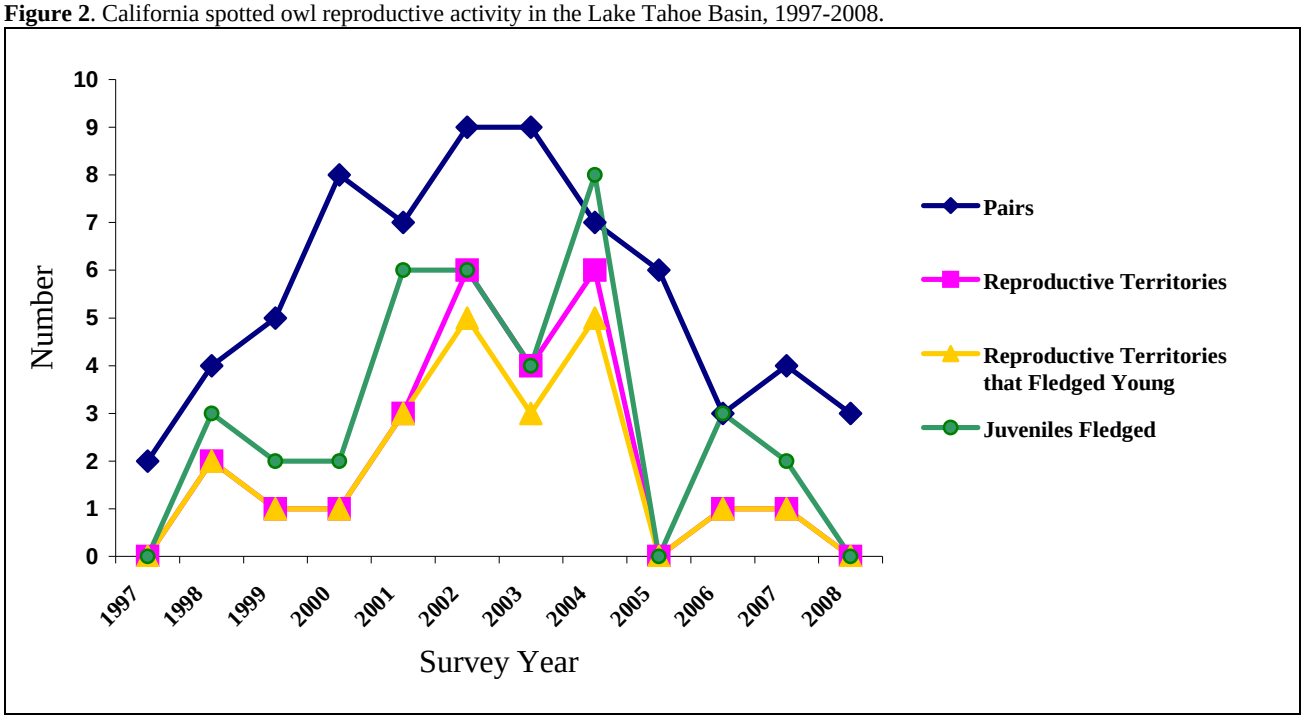


Table 2. Status of territories, pairs, reproductive activity and success for California spotted owls in areas surveyed by the Lake Tahoe Basin Management Unit, CDPR, Humboldt-Toiyabe National Forest (HTNF), NDOW, and Hauge Brueck Associates in 2008.

Survey Area	Individuals Detected	Territory Active	Pair	Territory Reproductive	Juveniles Fledged
Angora Creek	0	no	-	-	-
Angora Ridge	0	no	-	-	-
Blackwood Canyon	0	no	-	-	-
Bliss Creek	0	no	-	-	-
Burton FS	1	yes	no	unknown	-
Carnelian Bay	1	yes	no	unknown	-
Christmas Valley (BDOW survey)	1	yes	no	unknown	-
Cold Creek	0	no	-	-	-
Cold Creek nest	2	yes	yes	non-nesting	-
Fallen Leaf Lake	0	no	-	-	-
Griff Creek	0	no	-	-	-
Heavenly Ski Resort	0	no	-	-	-
High Meadow	0	no	-	-	-
Logan House Creek	0	no	-	-	-
Secret Harbor	0	no	-	-	-
Martis Peak	0	no	-	-	-
North Canyon (NDOW)	0	no	-	-	-
Page Meadows	1	yes	no	unknown	-
Round Hill	0	no	-	-	-

Survey Area	Individuals Detected	Territory Active	Pair	Territory Reproductive	Juveniles Fledged
Round Lake	0	no	-	-	-
Saxon Creek	2	yes	yes	unknown	-
S. Lake Tahoe Airport	0	no	-	-	-
Spring Creek	0	no	-	-	-
Sugar Pine Point State Park (CDPR)	2	yes	yes	non-nesting	-
Tahoe Mountain	0	no	-	-	-
Taylor Creek	0	no	-	-	
Twin Crags	0	no	-	-	-
Ward Creek	0	no	-	-	-
Total	**10**	**8**	**3**	**0**	**0**

1.1.3 DISCUSSION OF SURVEY RESULTS

The number of individual California spotted owls detected in the Lake Tahoe Basin increased from 1997 through 2002, remained fairly constant through 2004, decreased in 2005 and 2006, and increased in 2007 (Figure 1). The upward trend in number of individuals detected 1997-2002 is likely related to a concomitant increase in survey effort and effectiveness (due to increasing familiarity of the biologists conducting the surveys with the local habitat and owl population). Fluctuations in the number of individual spotted owls detected after 2002 (while survey effort was fairly constant) may be related to fluctuations in the number of juveniles fledged, the overall population trend, and environmental factors such as weather, prey availability, and habitat (Seamans et al., 2001). A downward trend in detections of individual spotted owls from 2005 to present is likely related to the absence of an El Dorado Spotted Owl Demography Study survey effort within the Basin. The demography study contributed substantially to the knowledge of spotted owl occurrence, reproductive activity, nest site and pair-fidelity in the Lake Tahoe Basin over the previous 7 years. Finally, as the amount of project work has increased, survey efforts have been focused accordingly (e.g., in suitable habitats near the project area, but not necessarily in historically occupied or prime habitats). Visits to historical territories where a project is not scheduled are not always possible due to time and budget constraints.

Spotted Owl catching a mouse. Photo courtesy of Silver Hartman.

At Burton FS, a female agitated call was heard during the first round of surveys. However, the surveyors did not realize it was a spotted owl, so no follow-up was done. There were no further detections at this territory for the rest of the season.

In Carnelian Bay, a male 4-note contact call was detected at call stations on two separate occasions. During a follow-up stand search conducted to locate that individual, a male contact call was heard once, about 100m from the original detection. There were no spotted owl detections for the rest of the season. The two separate detections are considered to be a single owl

and the reproductive status was undetermined in 2008 ('status unknown-single owl', USDA 1993).

A male spotted owl was detected by 4-note contact call at Christmas Valley on the Hawley grade trail, during the second visit of the barred owl survey. The spotted owl was heard while the crew was walking to a call station. The crew was not calling for spotted owl and no call (barred owl) was given before the male spotted owl 4-note call was heard. Follow-up surveys did not detect the spotted owl again, making it hard to determine the status of the Hawley grade territory ('status unknown-single owl').

Page Meadow had three detections in 2008, which was probably a single male owl detected on different nights and on the follow-up survey. The male that responded to observers with 4-note contact calls was detected near historic detection sites and was last detected in 2004, which was the last year the area was surveyed until this year. The owl was detected aurally and was not seen or moused. The Page Meadow owl detection is classified as 'status unknown-single owl'.

The Saxon Creek territory was surveyed and detected a spotted owl pair. Over the course of several visits, including nest site visits, both adults were observed near the nest last used in 2007. Two adult individual owls were not detected during an initial April visit to a historic nest, but were detected during protocol surveys in May. No nesting activity was apparent during the four nest checks that were conducted (two at the 2002/2007 nest and two at the 2003 nest). All the detections occurred near the 2007 nest site and the owl's behavior suggests that they did not nest this year. Based of the information collected, reproductive status was considered undetermined in 2008 ('nesting unknown-reproduction unknown').

Two adult individual owls were detected during an initial April visit to the historic nest site in the Cold Creek territory. The pair was detected near the original site, last active in 2006, but was not utilizing the old nest. During the first visit, both owls perched near the observers, but only the male took and ate mice, despite begging from the female. On the second visit, the adult male took mice, and no deliveries to the female occurred. Caching behavior was observed during the initial nest check and associated follow-up survey. The pair settled down to roost for the day in the same vicinity both times, and no nesting activity was evident. From caching and roosting observations the Cold Creek pair was assigned 'nonnesting inferred-nonreproduction inferred' status for 2008.

The Angora pair was observed inside the Angora burn area in the Angora Ridge survey polygon in early July 2007, post-fire and was assigned an active territory that year. Lacking further information, however, their assigned reproductive status for 2007 was 'nesting unknown-reproduction unknown'. Surveys were conducted in 2008 surrounding the fire area including most areas that were potential habitat. These areas were low to moderate burn intensities and still may be used by owls as forging habitat. Angora Ridge and Fallen Leaf Lake spotted owl survey polygons were also surveyed in an attempt to find the pair and determine their active territory. There were no detections of spotted owl in the areas surrounding the Angora fire (Tahoe Mountain, Angora, Angora Ridge, Fallen Leaf Lake survey polygons) in 2008.

The Sugar Pine pair was moused during both surveys but nesting status was undetermined. On both occasions four mice were offered and taken. During the first survey the first three mice fates were unknown while the fourth was eaten. During the second survey the first mouse's fate was unknown, the second and third mouse was eaten and the fourth mouse was killed, but had not been eaten when the surveyors left. The feeling of the surveyors

Spotted Owl pair roosting after the Angora Fire, 2007. Photo courtesy of Matthew James.

was that the owls were non-nesting, but this was not determined to protocol.

The number of active territories increased from 1997 until 2000, remained fairly constant through 2005 and averaged 9 active territories per year over the past twelve years (Figure 1). Active territories dropped in number from 9 in 2007 to 7(decreasing 33%) in 2008. Eighteen historically active territories were surveyed and 7 of those territories were active. Some pairs that have gone undetected in past seasons reappear in subsequent years. For example, while there were no detections in Blackwood Canyon in 2006, the spotted owl pair was detected in 2007, and in 2008 they again went undetected. It is not possible to know why some owl pairs were not detected in 2008; the owls may have shifted beyond the range of the survey as studies have shown spotted owls to forage with the largest rate of movement during the spring and summer (Forsman, E.D. 1980). Finally, it is possible, although statistically unlikely, that the owls were present but the surveys failed to detect them (Reid, J. A., 1999).

In 2008, most of our early nest surveys showed no signs of nesting. Spotted owls may not breed every year, but are able to compensate for this variable annual reproduction because they are long-lived with high adult survival rates (Seamans et al. 2001). During years of low reproduction the perennial nest sites often continue to produce young. This high reproductive success suggests that the habitat or forest structure surrounding perennial nest sites may positively affect reproduction (North et al. 2000). There are 10 known nest sites in the Basin, 6 of which have only been used once. The remaining 4 perennial nest sites (Sugar Pine Point SP, Burton Creek SP, Cold Creek and Saxon Creek) have been used successfully 2 to 4 times each.

All of the California Spotted Owl Protected Activity Centers (PACs) and Home Range Core Areas (HRCAs) within the Lake Tahoe basin were re-delineated in June of 2007 following Sierra Nevada Forest Plan Amendment, Final Supplemental Environmental Impact Statement, Record of Decision (2004) guidelines: "As additional nest location and habitat data become available, boundaries of PACs are reviewed and adjusted as necessary to better include known and suspected nest stands and encompass the best available 300 acres of habitat." New PACs were also established following Forest Plan direction and R5 protocol standards for resident single status and pair status. The PAC boundaries were revised or established using the best existing information regarding spotted owl detections, nest locations, habitat suitability, remotely sensed (satellite) imagery, aerial photography, and GIS analysis (habitat modeling, spatial review, etc.). Spotted owl nests, detections and their habitat were paramount in delineating PAC boundaries; however, practical management concerns (e.g., field recognition of land allocation boundaries, land use types, other forest resources, etc.) were also considered. PACs and HRCAs were remapped again in June of 2008 when more accurate forest boundary information became available. Changes to previous boundaries from this most recent re-mapping were generally slight.

The Tahoe Mountain California spotted owl PAC and HRCA were adversely affected by the Angora Fire. The Tahoe Mountain spotted owl PAC and HRCA were re-mapped as the majority of habitat within the PAC has been rendered unsuitable. The PAC was re-mapped within a 1.5 mile radius of the affected land allocation in suitable habitats, although few or no detections of the target species are known from those areas.

To address the concern whether the remapped PACs and HRCA are best located to protect the target species and their habitats, the PACs were surveyed to Region 5 protocol during the 2008 nesting seasons. No spotted owls were detected during the 2008 season and surveys will be conducted in 2009 as part of the Biological Resources and Monitoring Program (BRMP). If the target species (i.e. spotted owl) are detected the land allocation boundaries may be adjusted according to management direction for the LTBMU. If the target species are not detected and the habitats are determined to be of insufficient quality or quantity, the land allocations may then be re-evaluated in order to help determine if the PAC sufficiently encompasses the owl's active territory.

1.1.4 MANAGEMENT RECOMMENDATIONS

According to the Region 5 protocol recommendations, nesting status visits in the Sierra Nevada may begin as early as April 1 and should be completed by June 1. Conducting surveys during this early season period is important as California spotted owl reproductive activity (e.g., egg laying, incubation, and nestling) is occurring and is often detectable only during this portion of the year. After June 1, locating nest sites and assessing reproductive activity becomes more difficult as some juveniles fledge early and some nesting attempts may have failed and therefore go undetected. Since 2001, when the LTBMU started conducting surveys for California spotted owl earlier in the season, the number of detections and information about spotted owl reproductive activity has increased substantially. During the 2008 breeding season, spotted owl fieldwork began as soon as there were available personnel, with survey effort beginning on 15 April. Adverse weather conditions may occasionally impede early-season surveys, but surveys for spotted owl should continue early in the season to maximize the effectiveness of the information gathering effort.

The standardization and definition of local population parameters (e.g., active territories, reproductive territories, etc.) has improved our ability to assess spotted owl activity, territory activity, and fledging success in the Basin. Continued survey efforts over the past several years have revealed patterns which allow participating biologists to better estimate where owl nesting activity may be most likely to occur each year. Thus, these areas can be surveyed with initial efforts, which could more likely detect early-season activity and occupancy, important information needed in order to identify the potential need for new PACs and HRCAs. If annual budget allows, we should strive to utilize early-season efforts to maximize nest checks in historically active nesting areas, as a more complete view of spotted owl activity in the Lake Tahoe basin should better inform management decisions.

1.2 NORTHERN GOSHAWK

1.2.1 BACKGROUND, PROTOCOL, AND SURVEY METHODS

The LTBMU conducted northern goshawk surveys in collaboration with CDPR, NDOW, and Hauge Brueck Associates (contractor for Heavenly Ski Resort) in 2008 (Table 3). The Forest Service wildlife crew conducted dawn acoustical, broadcast acoustical, and stand search surveys for northern goshawks following the "Northern goshawk inventory and monitoring technical guide." (Woodbridge, 2006). Dawn acoustical surveys were conducted 5 March through 1 April. Broadcast acoustical surveys began 2 June and ended 23 August (Appendix 2). Stand search surveys followed goshawk detections during broadcast acoustical surveys as necessary. Suitable habitat was surveyed in proximity to USFS projects and selected areas with a history of goshawk activity.

A survey area was considered occupied during dawn acoustical surveys if there was a visual or audible detection. Similarly, an area was considered occupied during broadcast surveys if there were visual or audible detections or if plucking posts with typical goshawk prey species remains, such as northern flicker, Steller's jay, etc., were found. Survey areas were considered reproductively active if: 1) an adult bird or nestling(s) were observed on a nest; 2) there was fresh whitewash and goshawk feathers under a nest; or 3) fledglings along with other evidence of nesting were detected within an area. Survey areas were considered reproductively successful if fledgling(s) were detected either outside a nest in an area where an active nest was found or where evidence of nesting was found.

Table 3. Areas within the Lake Tahoe Basin surveyed for Northern Goshawk by the Lake Tahoe Basin Management Unit (LTBMU), EDAW, Hauge Brueck Associates, NDOW, and CDPR in 2008.

Survey Area	Historic Detections	Associated Projects
Angora Creek	Yes	Angora Long-Term Restoration, Fallen Leaf Lake Bike Trail, Aspen Community Restoration, Wildlife Monitoring
Big Meadow	Yes	Big Meadow Watershed - Fire Regime Restoration, Wildlife Monitoring
Blackwood Canyon	Yes	Blackwood Creek Channel Restoration, Aspen Community Restoration
Bliss Creek	Yes	Lake Tahoe Ecosystem Underburn
Burke Creek Lower	Yes	Nevada Beach Campground BMP Retrofit
Burton Creek (CDPR)	Yes	Riparian Hardwoods Restoration and Enhancement Project (CDPR project)
Camp Richardson	Yes	Fallen Leaf Lake Bike Trail
Cold Creek	Yes	Lake Tahoe Ecosystem Underburn
First Creek	Yes	Lake Tahoe Ecosystem Underburn
Griff Creek	Yes	Lake Tahoe Ecosystem Underburn, Wildlife Monitoring
Heavenly Ski Resort (Hauge Brueck Associates)	Yes	Heavenly Mountain Resort Master Agreement
High Meadows	Yes	High Meadows Bike Trail
Lily Lake	No	Aspen Community Restoration
Logan House Creek	Yes	Lake Tahoe Ecosystem Underburn
Marlette Creek	No	East Shore Beaches Trail Access and Travel Management Plan
Marlette Lake Basin and Ridge (NDOW)	Yes	Wildlife Monitoring
Martis Peak	Yes	Lake Tahoe Ecosystem Underburn
Meeks Bay	Yes	Meeks Creek Meadow Restoration, Meeks Meadow Washoe Restoration
Memorial Point (NDOW)	No	Sugarpine Project
North Canyon (NDOW)	Yes	North Canyon Old Growth Project
Page Meadows	Yes	Lake Tahoe Ecosystem Underburn
Saxon Creek	Yes	Wildlife Monitoring
Secret Harbor	Yes (NDOW)	East Shore Beaches Trail Access and Travel Management Plan, Lake Tahoe Ecosystem Underburn, Upland Wildlife Habitat Project (NDOW)
Sierra Creek	Yes	Wildlife Monitoring
Slaughterhouse Canyon	Yes	East Shore Beaches Trail Access and Travel Management Plan

South Lake Tahoe Airport	No	Upper Truckee River Restoration (multi-agency project)
Spooner Meadow (NDOW)	No	Upland Wildlife Habitat Project
Spring Creek	Yes	Fallen Leaf Bike Trail, Noxious Weeds Manual/Chemical Control
Sugar Pine Point State Park (CDPR)	Yes	Riparian Hardwoods Restoration and Enhancement Project (CSP project)
Tahoe Mountain	Yes	Angora Long-Term Restoration, Wildlife Monitoring
Taylor Creek	Yes	Fallen Leaf Lake Bike Trail
Trout Creek	Yes	Lake Tahoe Ecosystem Underburn
Tunnel Creek (NDOW)	Yes	Wildlife Monitoring
Ward Canyon	Yes	Lake Tahoe Ecosystem Underburn
Washoe Meadow (CDPR)	No	Proposed golf course expansion
Watson Creek	Yes	Lake Tahoe Ecosystem Underburn, North Lake Tahoe Bike Trail (EDAW)

Dawn acoustical surveys for goshawk were conducted starting 45 minutes before sunrise and ending 1½ hours after sunrise, in cooperation with our partners. For each survey, we distributed surveyors approximately 300 meters apart around focal areas (e.g., nest stands) where, historically, goshawk activity occurred. The number of surveyors participating varied between 1 and 4 dependent upon the size of the area to be surveyed and the availability of qualified observers to assist. These surveys were intended to be non-invasive: surveyors avoided approaching nests and did not broadcast calls. Surveyors left the area if detected individuals responded to observer presence with agitation.

Atypical goshawk nest detected by a private consultant on 22 August 2008 (photo courtesy of Steve Henderson)

Broadcast acoustical surveys were conducted in cooperation with our partners. Surveys were mostly conducted by 2 person crews. Surveys completed by a single highly qualified observer[1] were completed only outside of Protected Activity Centers (PACs). Alarm calls were broadcast during the nestling period (early June through mid-July) and a combination of juvenile begging, food delivery, adult wail, and alarm calls during the post-fledgling period (early July through late August). Goshawk calls were broadcast every 250 meters or less along transects within the survey polygon using a FoxPro broadcast system or MP3 player with a megaphone. Approximated locations of all broadcast locations, transects, and detections were plotted on site maps. Given this species' high degree of territory and nest stand fidelity, historic nest sites were surveyed first in an attempt to improve the assessment of nesting activity within the Basin. None of these resulted in detections.

1.2.2 SURVEY RESULTS

The LTBMU and partner agencies conducted broadcast surveys within 35 areas around the Basin in 2008 (Table 4). The USFS surveyed a total of 11,131 acres (4,505 hectares). CDPR surveyed 2,158 acres (873 hectares). Hauge Brueck Associates surveyed 1,176 acres (476 hectares). The number of acres surveyed by NDOW is not available at the time of this writing. Goshawks were detected within 27% (3 of 11) of the areas where dawn acoustic surveys were conducted and within 18% (6 of 34) of the areas where broadcast surveys were conducted in 2008. Only two nests were discovered in the Basin this year: one in an historic nest tree in Burton State Park during a broadcast survey by CDPR biologists, and one by a private environmental consultant (EDAW) with permission to survey per the North Tahoe Bike Trail multi-agency project on private land near the Watson Creek survey area. The Watson Creek nest was found during a general wildlife habitat survey. The Burton Creek nest fledged one juvenile. The Watson Creek nest also fledged one juvenile. Including incidental sightings, there were goshawk detections within 10 areas in 2008.

Table 4. Survey Areas and results of northern goshawk surveys conducted by Lake Tahoe Basin Management Unit (LTBMU), EDAW, Hauge Brueck Associates, NDOW, and CDPR within the Lake Tahoe Basin in 2008.

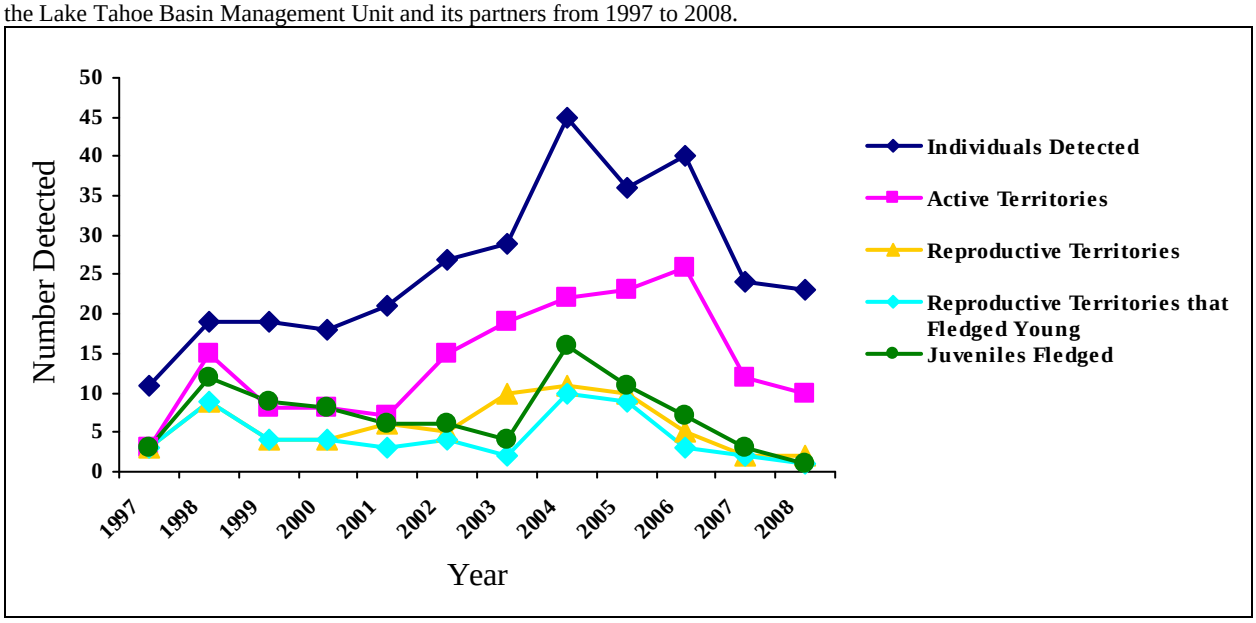
Area	Dawn Acoustic Survey	Dawn Acoustic Detection	Broadcast Survey	Broadcast Detection	Nest Found	Nest Outcome
Angora Creek	No	N/A	Yes	Yes	No	N/A
Big Meadow[1]	Yes	Yes	Yes	Yes	No	N/A
Blackwood Canyon	No	N/A	Yes	Yes	No	N/A
Bliss Creek	No	N/A	Yes	No	No	N/A
Burke Creek Lower	No	N/A	Yes	No	No	N/A
Burton Creek (CDPR)	Yes	Yes	Yes	Yes	Yes	1
Camp Richardson	No	N/A	Yes	No	No	N/A
Cold Creek	No	N/A	Yes	No	No	N/A
First Creek	No	N/A	Yes	No	No	N/A
Griff Creek	No	N/A	Yes	No	No	N/A
Heavenly Ski Resort (Hauge Brueck Associates)	Yes	No	Yes	No	No	N/A
High Meadows	No	N/A	Yes	Yes	No	N/A
Lily Lake	No	N/A	Yes	No	No	N/A
Logan House Creek	No	N/A	Yes	No	No	N/A
Marlette Creek	No	N/A	Yes	No	No	N/A
Marlette Lake and Ridge (NDOW)	Yes	No	Yes	No	No	N/A
Martis Peak	No	N/A	Yes	No	No	N/A
Meeks Bay	No	N/A	Yes	No	No	N/A
Memorial Point (NDOW)	Yes	No	Yes	No	No	N/A
North Canyon (NDOW)	Yes	No	Yes	No	No	N/A
Page Meadows[2]	No	N/A	Yes	No	No	N/A
Saxon Creek	No	N/A	Yes	No	No	N/A
Secret Harbor	Yes	No	Yes	No	No	N/A
Sierra Creek[1]	Yes	Yes	Yes	No	No	N/A
South Lake Tahoe Airport	No	N/A	Yes	No	No	N/A
Spooner Meadow (NDOW)[3]	Yes	No	No	N/A	No	N/A
Spring Creek	No	N/A	Yes	No	No	N/A

Area	Dawn Acoustic Survey	Dawn Acoustic Detection	Broadcast Survey	Broadcast Detection	Nest Found	Nest Outcome
Sugar Pine Point State Park (CDPR)	Yes	No	Yes	No	No	N/A
Tahoe Mountain	No	N/A	Yes	Yes	No	N/A
Taylor Creek	No	N/A	Yes	No	No	N/A
Trout Creek	No	N/A	Yes	No	No	N/A
Tunnel Creek (NDOW)[3]	Yes	No	No	N/A	No	N/A
Ward Canyon	No	N/A	Yes	No	No	N/A
Washoe Meadow (CDPR)	No	N/A	Yes	No	No	N/A
Watson Creek[2]	No	N/A	Yes	No	No	1

[1] Detection during dawn acoustical in area of historical nest; no nesting activity upon follow-up nest checks.
[2] No detections during broadcast surveys but one or more incidental sightings in the area.
[3] Dawn acoustic survey conducted in area; no broadcast surveys.

Each year, some survey areas are based on project areas that need wildlife surveys to be in compliance with NEPA. Survey areas were established in highly suitable to marginally suitable habitats within ¼ mile of agency project-implementation sites; including fuels treatment, habitat restoration, and trail reroute projects These surveys are conducted to determine presence/absence within or near a project area. The following tentative representation of northern goshawk individuals, active territories, and reproductive success (for 2008 project survey areas) is included for the sake of continuity between annual reports. This is not a statistically viable representation of the goshawk population over time due to the possibility of biased sampling and variable survey effort and methodologies over the years. The LTBMU and its partners recorded 23 goshawk detections (down 4% from 24 in 2007), 10 active territories (down 17% from 12 in 2007), 2 reproductively active territories (equal to the number in 2007), 2 known reproductively active territories that fledged young (equal to the number in 2007), and 2 known juveniles fledged (down 22% from 3 in 2007) in 2008 (Figure 3).

Figure 3. Graph of number of northern goshawk individuals, active territories, and reproductive success detected by the Lake Tahoe Basin Management Unit and its partners from 1997 to 2008.



1.2.3 DISCUSSION OF SURVEY RESULTS

The USFS again focused survey efforts largely on project areas in 2008. Most of these projects involved thinning which should move the existing forest structure toward more sustainable and resilient forest conditions, reducing the likelihood of stand replacing wildland fires, and contributing to the long-term suitability of goshawk habitats where possible. Other projects include trail re-alignment to reduce erosion, meadow restoration and stream channel restoration. We did not conduct broadcast surveys within all historic territories, though 35% (12 of 34) of the broadcast survey polygons contained historic nest sites.

In terms of area surveyed during broadcast surveys, goshawk search effort by LTBMU field crews declined 34% in 2008 over the previous field season. While goshawk detections continued to exhibit a slight downward trend (4% less than in 2007), this figure is significantly less than the reduction in total acres surveyed. While continued low detection levels compared to previous years are still unexplained outside of survey effort intensity (see 2007 annual report), a climatologically similar winter prior to the 2008 breeding season can be noted again as a possible correlation.

Many of the detections were in areas where individuals were found last year (e.g., Angora Creek, Blackwood Canyon, Burton Creek, and High Meadows). However, no checks conducted on historical nests which were used in recent years resulted in detections. Dawn acoustical surveys yielded alarm calls at Sierra Creek and goshawk wails at Big Meadow, but there were no signs of individuals or nesting activity upon nest checks or broadcast surveys later on in the season. While both areas could have contained nests early on which later failed, the adults that were originally detected do not appear to have remained in the area. No individuals were detected in adjacent areas, so questions regarding mid-season re-adjustment of territories remain open. It is also possible that adults continued to occupy the same territories, but did not respond to surveyor calls following nesting failure.

Two survey areas, Angora Creek and Tahoe Mountain, contained sizeable sections of low to moderate severity burned forest as a result of the Angora Fire of 2007. In 2007, survey efforts in areas burned by the Angora Fire ceased following the incident, mostly due to practical safety concerns. We speculated that in 2008, following hydromulch treatment, hazard tree removal, and re-opening to the public, protocol surveys in burned areas could provide useful information regarding goshawk use of burned habitat. This year, of the 23 separate goshawk detections in the LTBMU, 4 occurred in burned areas classified as moderate in severity. While only two of these detections were individuals rather than evidence (plucking posts), goshawks are clearly utilizing these areas post-fire.

The Seneca Pond goshawk PAC was moved in late 2007 following high severity burning through most of the area in the Angora Fire. The new PAC was placed in an area which contained no historical goshawk records. Three detections within the Seneca Pond PAC boundary this year will allow the PAC to remain in it current location. The Tahoe Mountain PAC, also moved to accommodate habitat alteration due to fire, had no detections in 2008. If the target species are not detected in 2009 and/or the habitats are determined to be of insufficient quality or quantity, the decision to re-map the land allocation may be re-evaluated. If goshawks are detected, PAC boundaries may be adjusted according to management direction for the LTBMU.

1.2.4 MANAGEMENT RECOMMENDATIONS

Having ascertained in 2008 that goshawks occur locally in burned areas, the LTBMU should appropriately manage areas subjected to natural and prescribed fires. Protocol surveys will occur in PACs next year, but are also recommended in other burned areas for the sake of gathering additional practical data on goshawk habitat use chronology in burn-affected areas.

Reproductive information can be better collected by prioritizing dawn acoustic surveys in more areas in future years to assess early season reproductive activity and emphasizing broadcast surveys within areas where detections occurred during dawn acoustic surveys. Expanding the coverage of project area broadcast surveys to include adjacent historical nesting areas if time and budget permits may increase detections, nesting status results, movement and home range data, and reproductive success information.

1.3 OSPREY

1.3.1 BACKGROUND, PROTOCOL, AND SURVEY METHODS

The LTBMU led collaborative surveys with TRPA to assess the spatial location and reproductive activity of osprey nesting in the Lake Tahoe Basin in 2008. TRPA led osprey monitoring efforts prior to 2004 and provided monitoring records of osprey nesting activity collected from 1976-2003. In 2004, the USFS took the lead for the osprey surveys and data management in the Lake Tahoe Basin. Surveys were conducted for osprey and osprey nests within approximately ¼ mile of the shorelines of Lake Tahoe, Fallen Leaf Lake, and Cascade Lake, and at the following sites located further inland: CAB01, CAB03, CRB01, CRB02, MMP04, MMP06, MMP07, SKH08, SKH11, DMP09, DMP10, GLB03, CVR03, CVR04, CVR05, and FLP02 (Appendix 3). California State Parks conducted independent surveys in the near-shore areas of Bliss, Sugar Pine Point, Burton, and Emerald Bay State Parks between 21 April and 28 August 2008. Nevada Department of Wildlife (NDOW) monitored Marlette Lake, Tunnel Creek, Bonpland Creek, Slaughterhouse Canyon, and Memorial Point for osprey activity during the 2008 breeding season.

We followed the "TRPA Osprey Boat/Walk-In Protocol" and conducted surveys from 13 May 2008 through 19 September 2008. Surveyors visited all known osprey nest sites during the initial visiting period in May, excepting those designated "tree gone" with certainty during the 2007 field season. Once a month over the next four months, LTBMU biologists continued to visit all historical sites for which the nest tree was confirmed to still be standing, with a minimum of 17 days between return visits. The Lake Tahoe shoreline was surveyed from aboard a TRPA boat at low speed (<8 mph) approximately 75 meters from shore on 21 May, 26 June, 25 July, 15 August, and 8 September 2008. Fallen Leaf Lake nests were surveyed from a boat for the June and July visits. The remaining sites were surveyed shortly before or after each boat survey by hiking to vantage points near and above (if possible) nest sites, but far enough away to avoid disturbing nesting activity. Nests were considered active if nesting activity was observed on any visit. Surveyors spent several minutes per visit at each active nest site to assess nesting activity and conducted additional visits as necessary through 22 September 2008 to determine nest fate and reproductive success. Nests that had never been detected before were labeled with a 3-letter prefix to indicate relative location (per method developed by TRPA, see Appendix 3) and with a numerical suffix to indicate order of discovery for that area. For example, the fifth recorded nest in the South Lake Tahoe area, a new initiation this field season, was labeled SLT05.

SLT06, active throughout the 2008 breeding season, successfully fledged two young.

We collected digital photographs of new nests to facilitate nest tree identification as

part of a photo-inventory project begun by TRPA in 2000. We also tried to photograph old nests not previously included in the inventory and those which had changed in character substantially (e.g., half of the nest tree had fallen) since the last photograph was taken.

1.3.2 SURVEY RESULTS

The LTBMU, NDOW, CDPR, and TRPA surveyed 15,171 acres (6,140 hectares) of suitable osprey habitat and made initial visits to 77 historic nest sites. Six nest trees confirmed or discovered to have fallen were assigned 'tree gone' status and not subsequently re-visited. Over the course of the 2008 field season, 6 additional trees were observed to contain new osprey nests, to which visits continued for the remainder of the summer. CDPR visited 19 nest sites and observed current active nests at 10 of those trees. NDOW observed osprey activity at Marlette Lake, Tunnel Creek, Bonpland Creek, Slaughterhouse Canyon, and Memorial Point throughout the 2008 season. While osprey were again observed soaring over Marlette Lake during the 2008 season, NDOW finally concluded that there has never been a nest near the lake. Nest MAL01, previously assumed to exist but with no UTMs recorded on official record, was removed from the ArcMap historical shapefile. It is now assumed, due to consistency in observing an osprey pair soaring over Marlette Lake, that there is probably a nest in neighboring Hobart Canyon, just outside the Tahoe Basin. In total, the LTBMU and its partners surveyed 77 nest sites and detected 35 intact nests (plus 4 dilapidated), 22 (63%) of which were active, in the Lake Tahoe Basin (Table 5). Six completely new nest trees were located during the 2008 survey season. We determined that, of the 139 nest sites in the Lake Tahoe Basin, 70 nest trees had fallen or been removed. These nest sites will remain in the database but will be removed from the GIS layers showing current osprey nest sites.

Table 5. The total number of osprey nests, active nests, and successfully fledged juveniles detected by LTBMU and its partners, 1997-2008, within the Lake Tahoe Basin.

Nest Site	Nest Present	Nest Active	Juveniles Fledged	Nest Site	Nest Present	Nest Active	Juveniles Fledged
CAB01	Yes	Yes	1	GLB03	ND		
CAB02	No			MAL01[2]	N/A		
CAB03	TG			MMP01	TG		
CHB01	TG			MMP02	TG		
CHB02	TG			MMP03	TG		
CHB03	TG			MMP04	No		
CRB01	No			MMP05	Yes	Yes	1
CRB02	No			MMP06	ND		
CSL01	TG			MMP07[3]	Yes	Yes	
CSL02	TG			MMP08*	Yes	Yes	2
CSL03	TG			RUB01	TG		
CSL04	No			RUB02	TG		
CSL05	TG			RUP01	Yes	Yes	
CSL06	No			RUP02	TG		
CSL07	Yes	Yes		RUP03	Yes	Yes	
CSL08	Yes			RUP04	Yes	Yes	
CVR01	TG			RUP05	TG		
CVR02	TG			RUP06	TG		
CVR03	Yes			RUP07	No		
CVR04	TG			RUP08	TG		

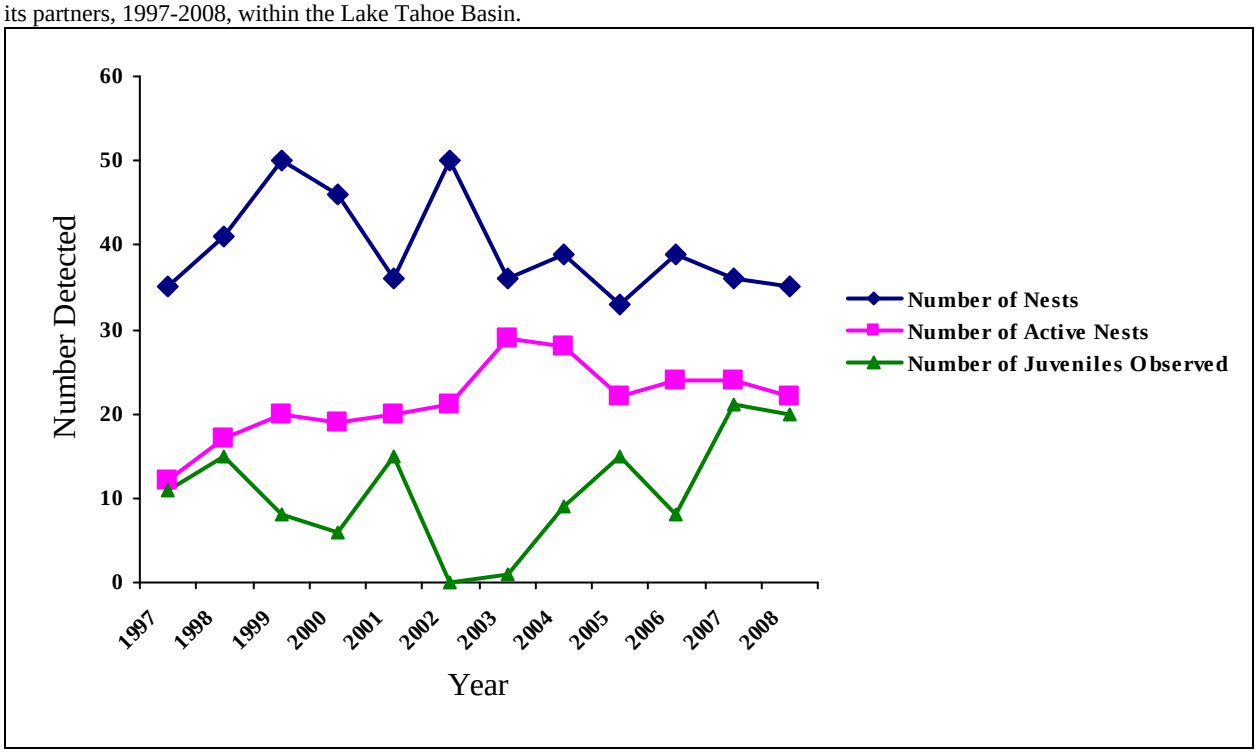
Nest Site	Nest Present	Nest Active	Juveniles Fledged	Nest Site	Nest Present	Nest Active	Juveniles Fledged
CVR05	Yes			RUP09	Yes	Yes	
DMP01	TG			RUP10	TG		
DMP02	TG			RUP11	No		
DMP03	Yes	Yes	2	RUP12	TG		
DMP04	TG			RUP13	No		
DMP05	TG			RUP14	TG		
DMP06	TG			RUP15	Yes		
DMP07	TG			RUP16	No		
DMP08[1]	UNK			RUP17	TG		
DMP09	No			RUP18	TG		
DMP10	Yes	Yes	2	RUP19	TG		
ECO01	TG			RUP20	TG		
ECO02	TG			RUP21	No		
EMB01	TG			RUP22	TG		
EMB02	Yes	Yes		RUP23	No		
EMB03	TG			RUP24	No		
EMB04	TG			RUP25	No		
EMB05	Yes	Yes	3	RUP26	Yes		
EMB06	TG			RUP27*	Yes		
EMB07	TG			SAH01	TG		
EMB08	TG			SAH02	Yes	Yes	
EMB09	No			SAH03	TG		
EMB10	TG			SAH04	TG		
EMB11	No			SAH05	TG		
EMB13	TG			SAH06	No		
EMB14	Yes	Yes	2	SAH07	No		
EMB15	No			SCH01	TG		
EMB17	Yes			SCH02	Yes		
EMB18	No			SCH03	No		
EMB19	No			SCH04	TG		
EMB20	Yes	Yes		SCH05	TG		
EMB21	Yes			SCH06	No		
EMB22*	Yes			SCH07	No		
FLL01	TG			SKH01	TG		
FLL02	TG			SKH02	TG		
FLL03	TG			SKH03	ND		
FLL04	Yes	Yes		SKH04	TG		
FLL05	TG			SKH05	TG		
FLL06	No			SKH06	TG		
FLL07	TG			SKH07	No		
FLL08	TG			SKH08	TG		
FLL09	Yes			SKH09	TG		
FLL10	TG			SKH10	No		
FLL11	TG			SKH11	No		
FLL12	TG			SLT01	TG		
FLL13	TG			SLT02	Yes	Yes	3

Nest Site	Nest Present	Nest Active	Juveniles Fledged	Nest Site	Nest Present	Nest Active	Juveniles Fledged
FLL14	Yes			SLT03	No		
FLL15	No			SLT04	No		
FLL16*	Yes	Yes		SLT05*	Yes	Yes	
FLL17*	Yes			SLT06*	Yes	Yes	2
FLP01	No			SLT07*	ND		
FLP02	No			SPP01	TG		
GLB01	No			SPP02	Yes	Yes	2
GLB02	No						
Subtotal	**19**	**10**	**10**	**Subtotal**	**16**	**12**	**10**
				Grand Total	**35**	**22**	**20**

* Indicates new nest detected during 2008 surveys.
TG indicates that nest tree is gone (fallen or removed due to hazard potential).
ND indicates a dilapidated nest (falling apart or obviously unmaintained).
[1] Previously assumed to be seen from Lake Tahoe; now uncertain. Possible inaccuracy of recorded UTM coordinates. Should be surveyed on foot during initial nest checks in 2009.
[2] Removed from historical nest records following the 2008 season
[3] Active with only male present in early season and later abandoned; no reproductive activity

Of the 22 active osprey nests detected, juvenile osprey fledged successfully from 10 nests (45%) (Appendix 4). A total of 18 juvenile ospreys were confirmed to have fledged in 2008, with 2 additional nestlings assumed successfully reared. In total, the LTBMU and its partners detected 35 osprey nests (down 3% from 36 in 2007), 22 active nests (down 8% from 24 in 2007), and 20 juveniles (down 5% from 21 in 2007) (Figure 4).

Figure 4. The total number of osprey nests, active nests, and successfully fledged juveniles detected by LTBMU and its partners, 1997-2008, within the Lake Tahoe Basin.



Photographs were taken of most new 2008 nests and old nests whose appearance had changed. Copies of the photos were filed appropriately in the osprey photo binder continuing the photo-inventory project initiated by TRPA. The Wildlife 2000 database and GIS shape files were updated with the osprey data collected during the 2008 survey season.

1.3.3 DISCUSSION OF SURVEY RESULTS

The osprey survey effort, expanded in 2005 in comparison to 2004 due to increased staffing and additional survey efforts performed by CDPR, continued through 2008. Surveys were well distributed throughout the osprey nesting season (May-September) and additional visits to active nests were completed as necessary to determine reproductive activity and success. The final round of surveys occurred during the third week of September. As in 2007, the number of juveniles observed in 2008 (20) is over twice the average (8.8) for the period 1997-2006 (Figure 5). The 2007-08 fledging rates may partially be due to higher numbers of visits between the efforts of all agencies involved in osprey monitoring over the past two field seasons.

The osprey population in the Lake Tahoe Basin does not appear to have been affected by the 2007 Angora Fire, as most of the burned area occurred away from lake shoreline habitat. While additional runoff due to fire effects has been an issue over the past year, fish populations, the primary food source for osprey, appear to have been minimally impacted. While generally a poor year for reproduction and activity in most LTBMU monitored species, osprey do not appear to have suffered from whatever possible unknown environmental factors may be responsible for declined wildlife detections.

1.3.4 MANAGEMENT RECOMMENDATIONS

The collaborative efforts of the LTBMU, TRPA, NDOW, and CDPR have refined osprey surveys within the Lake Tahoe basin and initiated the development of a database that will further contribute to our understanding of status and change in the local osprey population. This database should continue to be maintained and shared with partner agencies. Five boat surveys were done in collaboration with TRPA starting in mid-May. Initial surveys in subsequent years should continue to be initiated in May, or even late April, in order to best detect early nesting attempts. September surveys may also reveal late-season nest activity and indicate trees that individuals will return to early during the next breeding season and continue to build. If funding were available, October monitoring could provide information on migration chronology.

1.4 BALD EAGLE

1.4.1 BACKGROUND, PROTOCOL, AND SURVEY METHODS

The LTBMU hosted the 26th annual mid-winter bald eagle count on January 11, 2008 as part of an ongoing effort led by the UC Santa Cruz Predatory Bird Research Group (SCPBRG) to assess the status of bald eagle populations in California, and to contribute to the National Midwinter Bald Eagle Survey. The mid-winter count is a one-day event in which participants, arrayed at suitable sites

BAEA01/EMB16, a bald eagle nest usually observed during monthly osprey boat surveys, pictured from the lake just west of the mouth of Emerald Bay. This nest successfully fledged two young in 2008.

throughout the Lake Tahoe Basin, watch for bald eagles during a pre-established three-hour time period (Appendix 5). Participants were recruited by the LTBMU from local agencies and the community. Volunteers recorded the time, direction of flight, and age-class of all bald eagles detected. The data was reviewed to determine whether multiple observers may have recorded the same bald eagle (based on time and direction of flight) before a summary report was distributed to participants and the SCPBRG.

The LTBMU also conducted limited bald eagle nest surveys in conjunction with the osprey nest survey program (Appendices 3 and 5). We surveyed the bald eagle nest at Emerald Point in Emerald Bay for signs of eagles or nesting activity 5 times between May and September 2008 from the TRPA boat during osprey nest surveys. California State Parks surveyed the Emerald Point nest 6 times between March and July 2008. The latter surveys were conducted from above the nest on the Vikingsholm access road. We also surveyed suitable eagle habitat within approximately ¼ mile of the shorelines of Lake Tahoe, Cascade Lake, and Fallen Leaf Lake, incidentally, as part of the osprey nest survey program. NDOW conducted similar incidental surveys at Marlette Lake in 2008, but observed no sign of nesting activity.

1.4.2 SURVEY RESULTS

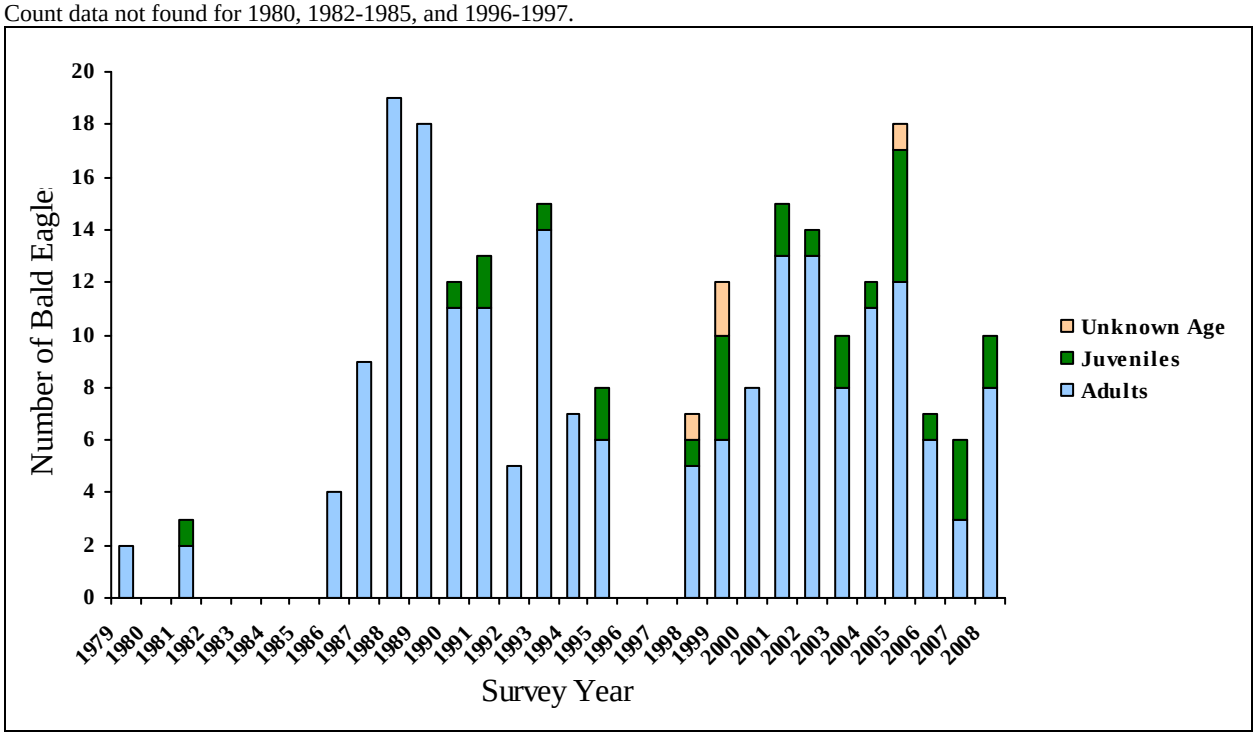
Thirty-eight participants, stationed at 26 survey points around the Basin, observed 10 bald eagles (8 adults and 2 immatures) during the 2008 mid-winter bald eagle count (Table 6). Bald eagles were detected at 12 locations.

Table 6. Locations and age-classes of bald eagles detected during the mid-winter bald eagle count conducted by the Lake Tahoe Basin Management Unit and its partners, January 11, 2008. Later data comparison concluded that the same individual was detected at Baldwin Beach, Pope Marsh, and Valhalla Pier, and at Nevada Beach and Round hill Pines Resort.

Survey Location	Bald Eagles Detected
Baldwin Beach	1 adult
Cave Rock	1 adult
Flick Point/Carnelian Bay	1 adult
Glenbrook	1 juvenile
Lake Forest	1 adult
Meeks Bay	2 adults
Nevada Beach	1 adult
Pope Marsh	1 adult
Round hill Pines Resort	1 adult
Sugar Pine Point State Park	1 juvenile
Valhalla Pier	1 adult
Zephyr Cove	1 adult

The number of bald eagles detected during the mid-winter count increased in 2008 (n= 11, up 83% from 6 in 2007) (Figure 5).

Figure 5. Bald eagles detected during mid-winter counts in Lake Tahoe Basin in 1979, 1981, 1986-95, and 1998-2007. Count data not found for 1980, 1982-1985, and 1996-1997.



The nest in Emerald Bay (BAEA01/EMB16) was the only successful nest observed in the Lake Tahoe Basin in 2008 and it fledged 2 juveniles. The number of active bald eagle nests detected (n=1, down from 2 in 2007) and juveniles fledged (n=2, same as 2007) is consistent with numbers recorded during the 1997-2006 period (Table 7).

Table 7. Number of bald eagle nests and fledged juveniles detected in Lake Tahoe Basin, 1997-2008.

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Active Nests	1	1	0	0	0	1	1	0	1	1	1	1
Juveniles Fledged	2	2	0	0	0	2	0	0	1	2	2	2

1.4.3 DISCUSSION OF SURVEY RESULTS

In 2008, more than twice the number of bald eagles was recorded during the mid-winter bald eagle survey as compared to 2007. Although it is possible that the LTBMU harbored more individuals this year, the disparity may be at least partially explained by the difference in weather conditions during the survey from one year to the next. While visibility was poor and snow showers were seen in 2007, 11 January 2008 was a calm, clear day. The same sites were surveyed both years, however there were 12 additional observers at the same number of stations in 2008. This may have contributed to the increased sightings.

1.4.4 MANAGEMENT RECOMMENDATIONS

Our continued participation in the mid-winter bald eagle survey is important in assisting the UC Santa Cruz Predatory Bird Research Group in their long-term effort to assess population levels nationwide. This participation should continue in the future.

With the leadership of CDPR, survey efforts at the Emerald Point bald eagle nest verified reproductive success in Emerald Bay. Continued collaboration with California Department of Parks and Recreation and Nevada Department of Wildlife is necessary to adequately assess bald eagle fecundity in the Lake Tahoe Basin.

1.5 GOLDEN EAGLE

The LTBMU annually observes a historic golden eagle nest located on a bluff east of Round Lake. Golden eagles were originally monitored by the Tahoe Regional Planning Agency (TRPA) as a Special Interest Species (SIS) for the Lake Tahoe Basin. Because of their SIS status, TRPA aims to maintain a minimum of 4 quarter-mile population sites (a.k.a. ‘threshold sites’ or ‘disturbance zones’) for golden eagle. The locations of these sites are identified on TRPA adopted Special Interest Species Map overlays (1987) and in the Environmental Impact Statement for the Establishment of Environment Threshold Carrying Capacities (TRPA 1982). The intent of TRPA SIS threshold standards is to protect and enhance critical habitat this species uses for significant periods of their life history and discourage harmful activities at current and future population sites. The SIS management goals for golden eagle have not been attained since their inception in 1982, in spite of available and relatively undisturbed nesting and roosting habitat.

The most recent record of golden eagle nesting activity within the LTBMU occurred in 2000, when a nesting pair was observed at the Round Lake site, though no young were fledged. No individuals at cliff territories or nests were recorded between 2001 and 2008 from non-protocol surveys or incidental observations. Two biologists conducted a non-protocol nest area survey on 13 May 2008, watching the bluff area from a vantage point near the Round Lake trail. One adult was incidentally recorded at Flick Point during the 2008 mid-winter bald eagle count. Management recommendations for future years include the re-instigation of protocol surveys, last conducted by LTBMU wildlife crews in 1999 and 2000.

1.6 BARRED OWL

Barred Owl in Oklahoma. Photo courtesy of David Arbour.

Barred owl (*Strix varia*) range expansion has been rapid over the past two decades, extending their range into the Pacific Northwest. Barred owls were first sighted in California in 1981 in Del Norte and Trinity counties. They now have been detected as far south as Sonoma County and Yuba County in the Sierra Nevada (Dark, S., 1998). Anecdotal evidence suggests that they may be displacing the federally threatened northern spotted owl (Kelly, E., 2003). Barred owl presence is increasing within the range of spotted owl, furthering the declines in the proportion of sites occupied by spotted owls. Barred owl presence has a negative effect on spotted owl detection probabilities, by either increasing local-extinction probabilities or decreasing colonization probabilities (Olson, G., 2005). According to research, occupancy of spotted owl territories decreases after barred owls are detected within 0.80 km of the territory center (Olson, G., 2005). In addition, barred owl × spotted owl hybrids have been reported in California. Because of the potential for hybridization, competition for food and habitat, and predation, it appears that the barred owl could influence spotted owl populations negatively.

In November of 2007 a barred owl (BDOW) was seen and photographed in Christmas Valley. The detection was reported to the forest service by the photographer. This was the first known detection of BDOW in the basin. The individual remained in the area for several days, but was not subsequently detected. Based on this sighting, a BDOW survey was conducted in 2008. One survey route consisting of several points in the Rainbow Tract area of Christmas Valley and several more from the historic Hawley Grade SPOW route were surveyed using 'Protocol for Surveying for Spotted Owls in Proposed Management Activity Areas and Habitat Conservation Areas' (USDA, revised 1993). This protocol was altered slightly by increasing the call time to 15 minutes. This decision was based on results found by McGarigal and Fraser, 1985, stating that "Where detection of most individuals is important, the sampling period should not be less than 15 minutes".

There were no BDOW detected during this survey. However, an unsolicited SPOW detection occurred (see section 1.1.3 for discussion).

No barred owls were detected during acoustic surveys in 2008, so it remains unclear what the status of barred owl is in the Lake Tahoe Basin. Based on this inconclusive survey, BDOW survey efforts should be suspended until/unless there is more evidence of their presence in the basin.

1.7 PEREGRINE FALCON

1.7.1 BACKGROUND, PROTOCOL, AND SURVEY METHODS

Late during the 2007 field season, the LTBMU visited two areas where reliable incidental detections of peregrine falcons had occurred during the 2007 breeding season. Cliff bands on South Maggie's Peak and Angora Peak each received one non-protocol visit during October 2007 by a single biologist. Specifically, the observer attempted to spot nests or any sign of nesting activity over the breeding season. Individuals were observed at South Maggie's Peak only, and no prior nesting activity was apparent at either location. LTBMU biologists returned to each site in April 2008 to initiate protocol surveys, additionally visiting Luther Spires to follow up on an incidental detection at this popular rock climbing area in November 2006 by an Eldorado National Forest biologist.

Peregrine falcon. Photo courtesy of Tom Kogut.

In accordance with "Protocol for Observing Known and Potential Peregrine Falcon Eyries in the Pacific Northwest" (J. E. Pagel, USFS internal document), each site was slated to be visited once a month, April through September 2008, with a minimum of 14 days between surveys. South Maggie's Peak and Luther Spires were each visited a total of 5 times during 2008 for a minimum of 4 consecutive hours per visit Following no detections in the first two visits to Angora Peak, surveys were discontinued per protocol. Observations were conducted by two biologists at a location suitable for observing the whole area for activity.

1.7.2 SURVEY RESULTS

South Maggie's Peak and Luther Spires were both determined to be active territories in 2008. In spite of repeated observations of peregrine falcon adults at both locations, no nests were located and no reproductive activity confirmed. As many as two adults were observed at once at South Maggie's Peak, though more often a single individual at a time. At Luther Spires, a pair of falcons was frequently observed. Wail calls were heard on a few surveys at both locations, although observers were unable to determine the age of the individual producing the sound. Aggressive territorial behavior was observed toward Cooper's Hawks that encroached on the cliff area, and toward a second pair of conspecifics that were eventually chased off. The origin of the second pair remains unknown.

1.7.3 DISCUSSION OF RESULTS

Ideally, peregrine falcons surveys would be conducted from a location near to the territory in question, including an open view of the cliff and slight altitudinal advantage over potential nesting and perching ledges. Unfortunately, these opportunities are rarely possible without disturbing the subjects under observation. During the June visit to Luther Spires, one team was posted at the usual observation location beneath the cliff while another biologist with a spotting scope observed from Echo Summit. While the second post offered an open view and superior altitude over the majority of the cliff face, the two kilometers of intervening distance created difficulty in seeing any activity whatsoever, although the observer was able to determine that the large hack box atop the cliff was not in use. This structure was installed in 1985 by the Santa Cruz Predatory Bird Research Group. Three juvenile birds were released at the hack box and successfully fledged later

that breeding season. The procedure was repeated in 1986 and 1987. It is not known if any breeding pairs used the structure in subsequent years as a nesting site.

1.7.4 MANAGEMENT RECOMMENDATIONS

The South Maggie's Peak territory is located far enough above a popular hiking and sightseeing area at the west end of Cascade Lake to not warrant much worry about disturbance. Luther Spires is a popular rock climbing destination, prone to human disruption which could affect reproductive attempts. Despite no confirmed reproductive activity at this site in 2008, the LTBMU should continue surveys in 2009 and close the area to public access if any nests are found near human-impacted portions of the site. Survey efforts could be expanded to check for nesting from the top of the cliff area, but only if the information thereby gained is determined to outweigh the additional possible disturbance to peregrine falcons.

1.8 WILLOW FLYCATCHER

1.8.1 BACKGROUND, PROTOCOL, AND SURVEY METHODS

The LTBMU conducted surveys for willow flycatcher (*Empidonax traillii*) in coordination with the Tahoe National Forest Willow Flycatcher Demography Study. A total of 11 sites were surveyed for this species in the Basin in 2008 (Appendix 7). All surveys followed the USFS, Region 5 protocol "A Willow Flycatcher Survey Protocol for California" (Bombay et al., 2003). The purpose of surveys was to assess presence or probable absence, reproductive activity, and nesting success of willow flycatcher. The LTBMU conducted surveys for willow flycatchers during the first (June 1–14) second (June 15-25) and third (June 26-July 15) survey periods. All sites were surveyed once during the (mandatory) second survey period. A minimum of 5 days elapsed between surveys of each site. Surveys began approximately 1 hour before sunrise and ended at or by 10:00 a.m. We broadcast willow flycatcher songs approximately every 50 meters within suitable habitat.

Willow flycatcher nestling banded in Blackwood Canyon, 2004.

The Tahoe National Forest Willow Flycatcher Demography Study was able to survey Trout Creek, Blackwood Creek, Tallac Creek, Taylor Creek, Pope Beach, and Uppermost Upper Truckee sites.

Survey site selection was determined according to direction given in the Sierra Nevada Forest Plan Amendment, Final Environmental Impact Statement, Record of Decision (hereafter ROD; 2004) and project work in suitable habitat (Table 8). The ROD describes willow flycatcher 'emphasis habitat' as meadows larger than 15 acres with standing water on June 1 and a deciduous shrub component; 'emphasis meadows' are meadows within 5 miles of a historically occupied site; and 'historically occupied sites' are those where this species is known to have occurred.

Table 8. Locations surveyed to assess presence or probable absence, reproductive activity, and nesting success of willow flycatcher by the Lake Tahoe Basin Management Unit and its partners within the Lake Tahoe Basin, 2008. Associated USFS projects listed may be under consideration, proposed, underway, or completed.

Survey Area	Type of Survey Area	Associated Project	Surveyor
Grass Lake	Historically Occupied	Biological Resources and Monitoring Program	LTBMU
South Lake Tahoe Airport	Historically Occupied	Upper Truckee River Restoration Project	
Al Tahoe	Historically Occupied	Lake Tahoe Ecosystem Underburn	
Ward Creek	Historically Occupied	Biological Resources and Monitoring Program	
Washoe SP	Historically Occupied	Biological Resources and Monitoring Program	
Blackwood Canyon	Historically Occupied	Blackwood Creek Restoration, Chemical/Manual Weed Control	
Taylor Creek	Historically Occupied	Chemical/Manual Weed Control, Taylor Creek EEC	Tahoe National Forest Willow Flycatcher Demography Study
Tallac Creek	Historically Occupied	No Project	
Uppermost Upper Truckee	Historically Occupied	No Project	
Upper Truckee Marsh @ Pope Beach	Historically Occupied	No Project	
Upper Truckee Marsh @ Trout Creek	Historically Occupied	No Project	

The demography study also conducted a conspecific attraction (CSA) experiment using Taylor Creek and Cookhouse Meadow as experimental sites paired with Trout Creek and Big Meadow respectively, as control sites.

Conspecific attraction is the tendency for animals to settle near other members of their species. The presence of conspecifics in an area may be a reliable indicator of habitat quality. CSA could potentially use this preference for previously settled sites to lure animals into settling at unoccupied sites by artificially introducing the cues naturally produced by conspecifics (Reed & Dobson 1993). CSA can provide a powerful tool for managing and conserving birds.

1.8.2 SURVEY RESULTS

The LTBMU and its partners surveyed an estimated 266 acres (108 hectares). LTBMU and Tahoe National Forest Willow Flycatcher Demography Study surveyed 133 acres (54 hectares) a piece. We calculated the area surveyed using 50 meter buffers around each survey point within a survey area. Willow flycatchers were detected in Blackwood Canyon, Tallac Creek marsh, Taylor Creek, and at the Uppermost Upper Truckee site (Table 9).

Male willow flycatcher (*Empidonax traillii*) perched on a willow. Photographer unkown.

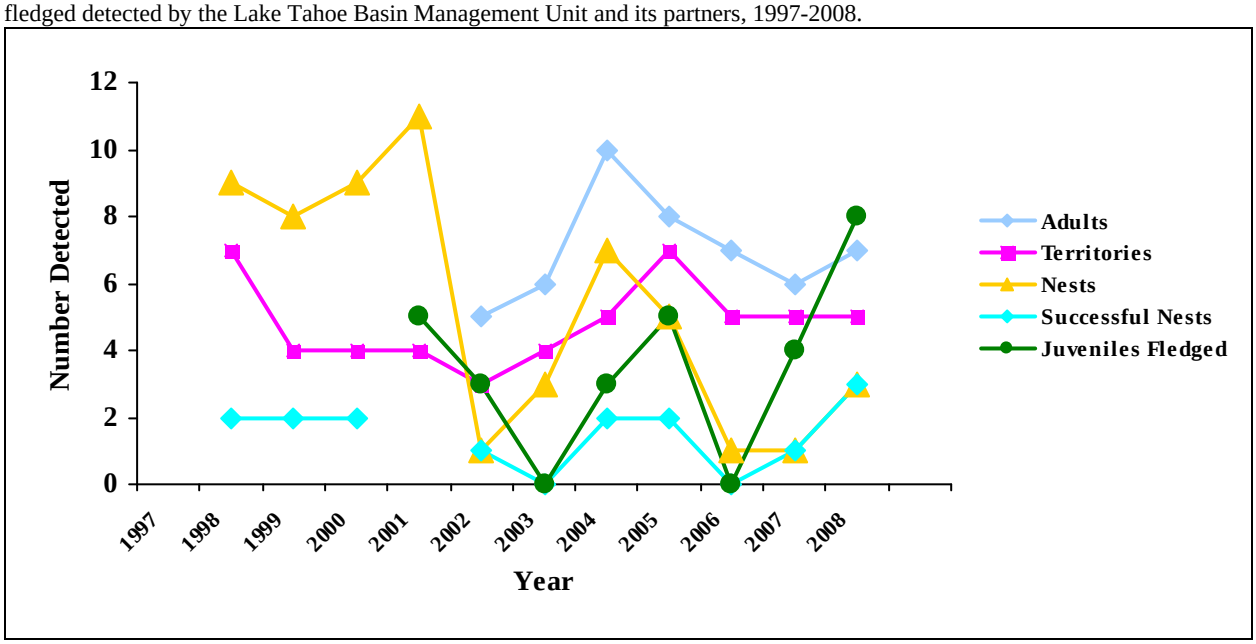
The LTBMU completed surveys for willow flycatchers at 5 sites between June 9 and July 11, 2008. Male willow flycatchers were detected during surveys of Tallac Creek, Blackwood Creek, Taylor Creek and Uppermost upper Truckee. The Tahoe National Forest Willow Flycatcher Demography Study monitored Tallac and Taylor Creek and reported 3 nesting attempts that were successful with 8 chicks fledged. Taylor Creek was one of the conspecific experiment sites and had 2 nests and 7 fledgling in 2008, where in previous years there has been no known nesting activity.

Table 9. Summary of willow flycatcher detections, nests, and recruitment in areas surveyed by the Lake Tahoe Basin Management Unit and its partners, 2007.

Survey Area	Territories	Adults	Nests	Nest Outcome	Juveniles Fledged
Al Tahoe	-	-	-	-	-
Blackwood Canyon	1	1	1	-	-
Grass Lake	-	-	-	-	-
South Lake Tahoe Airport	-	-	-	-	-
Tallac Creek	1	2	-	success	1
Taylor Creek	2	3	2	success	7
Trout Creek	-	-	-	-	-
Uppermost Upper Truckee	1	1	-	-	-
Ward Canyon	-	-	-	-	-
Washoe State Park	-	-	-	-	-
Totals	**5**	**7**	**3**	**3**	**8**

The number of willow flycatcher territories (n=5, equal to 5 in 2007), adults (n=7, up from 6 in 2007), nests (n=3, up from 1 in 2007), successful nests (n=3, up from 1 in 2007), and juveniles fledged (n=8, up from 4 in 2007) detected in 2008 are shown in comparison to those for the period 1997-2008 (Figure 6).

Figure 6. Number of willow flycatcher territories, adults, nests (including re-nests), successful nests, and juveniles fledged detected by the Lake Tahoe Basin Management Unit and its partners, 1997-2008.



1.8.3 DISCUSSION OF SURVEY RESULTS

The last remaining grazing allotment on Forest Service lands in the Lake Tahoe Basin is located in Tallac marsh and in the adjacent uplands. The LTBMU plans to protect the suitability of the existing willow flycatcher habitat in Tallac marsh by allowing only late-season grazing (after August 20) in the meadow as described in the Sierra Nevada Forest Plan Amendment, Final Supplemental Environmental Impact Statement, Record of Decision (2004). In 2007 the LTBMU conducted a willow flycatcher habitat assessment at the Tallac marsh in order to provide information on the long-term trends of vegetation communities in that complex. Disturbance activities, such as overgrazing or trampling by animals or people, result in vegetation changes to shallower, weakly rooted species. These species have a reduced ability to buffer the forces of moving water and keep the stream's hydrologic features in balance. Therefore, an evaluation of the vegetative composition can provide a valuable indication of the general health of a riparian area (successional status) as well as the current strength of the stream banks in buffering the forces of water (stream bank stability).

1.8.4 MANAGEMENT RECOMMENDATIONS

Willow flycatchers and their habitat would likely benefit in the long term from meadow and creek restoration projects, such as the Cookhouse Meadow, Big Meadow, Upper Truckee River, Blackwood Creek Lower Channel Restoration and High Meadows Restoration Projects. Restoration projects often raise water tables and may provide standing water when the climatic conditions are favorable for nesting and often later into the nesting season. Elevated water tables may also reduce nest and fledgling predation rates. Restoration of meadow vegetation may improve hiding and thermal cover for nesting and provide more abundant and better dispersed perches for foraging. Restored meadow vegetation and elevated water tables may increase local prey insect populations. The suitability of existing willow flycatcher habitat and probability of successful reproductive activity for this species at Tallac marsh would likely improve by an end in grazing currently permitted and restoring the meadow.

1.9 SMALL MAMMALS

1.9.1 BACKGROUND, PROTOCOL, AND SURVEY METHODS

The wildlife crew conducted post-restoration small mammal trapping at Blackwood Canyon (BC) and Fallen Leaf Lake (A06, FL20) from 28 July to 14 August, 2008. The surveys are an effort to monitor the Aspen Community Restoration Project to quantify the response of small mammals to the aspen restoration. The Blackwood Canyon site surveys were conducted along linear transects that ran parallel to Blackwood Creek. Transects began and ended at bird point-count stations (points C01, C02, etc.) that were established during past surveys. A total of 6 lines were set beginning at odd number bird count stations and ending 25 meters before the next even number call station. The transect lines were 250 meters long with traps placed every 25 meters, totaling 10 trap stations per transect. Alternating 25 meters trap location (or even number stations along the transect line), both large and extra large Sherman Live Traps were placed. At the odd number stations only large Sherman traps were set. Traps were placed within 2 meters of the transect line at habitat features such as logs, burrows, the base of trees, runways, and when possible, in areas that provided cover from weather and direct sun light (e.g., under shrubs, in tall grass). If the natural protective features were not present then the traps were covered using cardboard covers, bark, sticks and grass that were collected. The traps were set in morning of the first day of the survey and were baited with a mixture of rolled oats and peanut butter. The traps were checked twice daily (in the morning between 6:30 and 8:30am, and around dusk, 5:30 and 7:30pm) for three consecutive days, starting on the afternoon of the first day and finishing with the morning on the 4th day.

Fallen Leaf Lake surveys were conducted with a different spatial arrangement than the Blackwood surveys. Extra-large Sherman live traps were arranged along transects that radiated from a central point. The center points of the transect spokes for the two survey sites were established randomly at a five meter offset from the aspen stand centroid (or center of area). There were 6 transect lines that radiate out from the center point that were spaced 60 degrees apart. Extra-large Sherman live traps were placed every 15 meters along each transect line at the nearest appropriate location that ensured that the trap was sufficiently protected from the elements (e.g. sun). The traps were baited with rolled oats, peanut butter, and meal worms, which are a high energy food source, to attract insectivores such as shrews. Site A06 traps were checked twice daily (in the morning between 6:30 and 8:30am, and around dusk, 5:30 and 7:30pm) for three consecutive days, starting on the afternoon of the first day and finishing with the morning on the 4th day. Site FL20 traps were checked three times daily (morning, mid-day, and dusk) for three consecutive days.

All captured animals were identified to species, sexed and aged if possible. In previous years, chipmunks and squirrels were tagged with numbered aluminum ear tags that allow for individual identification. Ear tags were not used in 2008. This year, the animals were marked by clipping a small amount of fur from the side of the rump if possible.

1.9.2 SURVEY RESULTS

In five years of surveys, a total of 12 small mammal species were trapped at Blackwood Creek (Table 10). Seven small mammal species are listed as desired condition species for the Lake Tahoe Basin of those species the northern flying squirrel, western jumping mouse and Trowbidge's shrew were detected. There were also mammals captured that are on the list of potentially vulnerable mammals associated with aspen stands (Figure 7). The desired condition species' relative abundance was low each year that surveys were conducted. In addition to the desired condition species, meadow-associated voles were captured at Blackwood Creek and A06, and 2 shrew species at the Fallen Leaf Lake sites (FL20, A06). Voles and shrews were detected in

low numbers each year, although shrews were not detected at any of the three sites in 2004 and 2006.

Five to seven species of small mammals were captured during field seasons between 2004 and 2007 and six species were trapped in the 2008 season at FL20 (Table 10). In the past, northern flying squirrel, deer mouse, California ground squirrel, yellow-pine chipmunk, long-eared chipmunk, shadow chipmunk were captured. In 2005 montane vole, Trowbridge's shrews were captured and in 2004 a long-tailed weasel was trapped.

Table 10. Number of individuals of small mammal species captured within aspen arrays at Blackwood Creek, and Fallen Leaf Lake (FL20, A06), Lake Tahoe Basin, California, 2008.

Common Name	Scientific Name	Blackwood	FL20	A06 at Fallen Leaf Lake	Total (species)
Northern flying squirrel[1]*	*Glaucomys sabrinus*	-	3	-	3
Long-tailed vole*	*Microtus longicaudus*	-	-	-	0
Montane vole	*Microtus montanus*	-	-	1	1
Unidentified vole	*Microtus spp.*	9	-	-	9
Short-tailed weasel	*Mustela erminea*	-	-	-	0
Long-tailed weasel[1]	*Mustela frenata*	-	-	-	0
Deer mouse	*Peromyscus maniculatus*	13	3	1	17
Trowbridge's shrew[1]	*Sorex trowbridgii*	-	2	-	2
Vagrant shrew[1]*	*Sorex vagrans*	-	-	-	0
Montane shrew	*Sorex monticolus*	-	-	1	1
Unidentified shrew	*Sorex spp.*	-	-	1	1
California ground squirrel	*Spermophilus beecheyi*	-	6	9	15
Golden-mantled ground squirrel	*Spermophilus lateralis*	-	-	1	1
Yellow-pine chipmunk*	*Tamias amoenus*	30	9	-	39
Long-eared chipmunk	*Tamias quadrimaculatus*	-	12	-	12
Shadow chipmunk	*Tamias senex*	10	4	2	16
Lodgepole chipmunk	*Tamias speciosus*	17	1	22	40
Unidentified chipmunk	*Tamias spp.*	-	2	-	2
Douglas' Squirrel*	*Tamiasciurus douglasii*	-	-	-	0
Mountain pocket gopher	*Thomomys monticola*	-	-	-	0
Western jumping mouse[1]*	*Zapus princes*	1	-	-	1
	Total Captures (site)	80	42	38	
				Grand Total	160

[1] Desired condition species
* Potentially vulnerable mammal species associated with aspen

Figure 7. List of potentially vulnerable mammals associated with aspen stands (Manley et al. 2000).

- Water shrew *(Sorex palustris)*
- Vagrant shrew *(Sorex vagrans)*
- Broad-footed mole *(Scapanus latimanus)*
- Snowshoe hare *(Lepus americanus)*
- Pika *(Ochontona princeps)*
- Belding's ground squirrel *(Spermophilus beldingi)*
- Douglas' Squirrel *(Tamiasciurus douglasii)*
- Northern flying squirrel *(Glaucomys sabrinus)*
- Long-tailed vole *(Microtus longicaudus)*
- Yellow-pine chipmunk *(Tamias amoenus)*
- Western jumping mouse *(Zapus princeps)*
- Western gray squirrel *(Sciurus griseus)*
- Yellow-bellied marmot (*Marmota flaviventris*)
- Muskrat (*Ondatra zibethicus*)
- Mink (*Mustela vison*)
- Badger (*Tasidea taxus*)
- Wolverine (*Gulo gulo*)
- American marten (*Martes americana*)
- Sierra Nevada red fox (*Vulpes vulpes*)

The most abundant small mammal species captured at Blackwood Creek were the yellow-pine chipmunk (38% of total captures), lodgepole chipmunk (21% of captures), and the deer mouse (16% of captures). The lodgepole chipmunk (58% of captures) and the California ground squirrel (24% of captures) were the most abundant species captured at A06 (Fallen Leaf Lake). The long-eared chipmunk (28% of captures) and the yellow-pine chipmunk (21% of captures) were the most abundant species captured at FL20 The remaining species of montane vole, shadow chipmunk, golden-mantled ground squirrel, western jumping mouse, northern flying squirrel, shrew (spp.)and montane vole captured made up only about 20% of the total captures for all three sites combined.

1.9.3 DISCUSSION OF SURVEY RESULTS

Golden-mantled ground squirrel (Spermophilis lateralis) Photo courtesy of Nadine Hergenrider.

The wildlife crew conducted small mammal trapping at Blackwood Canyon and Fallen Leaf Lake from July 28th to August 14th, 2008 in an effort to monitor the Aspen Community Restoration Project. Studies have shown that aspen stands can have a greater diversity and abundance of mammals than surrounding conifer-predominated sites (Salt 1957, Flack 1976, DeByle 1985). Aspen stands are declining in habitat quantity and quality largely due to encroachment by conifers, which is caused by natural drought, human-induced lowering of water tables, fire suppression, and recreation impacts. Encroachment of conifers in aspen stands has a deleterious effect on herbaceous cover, stand moisture, insect abundance, and small mammal species richness and abundance. Aspen stand restoration entails the removal of encroaching conifer species. Removal of conifers can help aspen stands persist and preserve the ecological function of the aspen stands. The goal of the trapping survey effort is to quantify the response of small mammals to the aspen restoration.

The aspen stand which contains the small mammal trap site called FL20 and A06 were treated in 2004. Five to seven species of small mammals were captured during field seasons between 2003 and 2007 and six species were trapped in the 2008 season. Conifer thinning took place at Blackwood in 2005 and in the subsequent years no conclusions have been reached about the effect on small mammals populations. The aspen stand was in very poor condition, being choked out by conifer encroachment, and may take years to recover.

Overall captures across all mammal species among sites were considerably lower in 2008 compared to 2004. A variety of factors can influence small mammal populations. In Lake Tahoe, for example, mammalian species richness was positively associated with aspen-cottonwood, lodgepole pine, and elevation (Manley and Schlesinger 2001). Small mammal populations can be influenced environmental conditions such as vegetation type, precipitation, and downed woody debris (Manley and Schlesinger 2001). Small mammal populations often show annual fluctuations that may be related to changes in temperature, food resources or other factors. In fact, capture rates changed dramatically across sites and years. Long-term monitoring may facilitate more understanding about the changes in capture totals and of temporal patterns which are especially relevant in species whose populations fluctuate regularly.

1.9.4 MANAGEMENT RECOMMENDATIONS

Increasing habitat conditions for desired condition species is a goal of restoration efforts. Restoration actions should focus on maintaining open, wet meadows, retaining adequate downed woody debris and snags, and increasing willow cover to encourage the persistence of desired condition small mammal species and other meadow-associated species. Decreasing the density of conifers (fir trees) and emphasizing mature old-growth forest conditions can benefit species such as American marten. Based on habitat preferences of broad-footed moles and western jumping mice, restoration efforts should focus on improving moist soils conditions and increasing the length of time soil remains moist throughout the summer months. Western jumping mice also prefer open areas along margins of montane riparian areas and are usually associated with intermediate to dense herbaceous cover (Brown 1970, Belk et al. 1988). Restoration efforts should also focus on providing dense ground and canopy cover for Trowbridge's shrews and improving riparian vegetation for long-tailed weasels. Continued monitoring of other small mammal species is necessary to determine population status more accurately and to assess desired conditions for restoration.

1.10 BATS

1.10.1 BACKGROUND, PROTOCOL, AND SURVEY METHODS

During the 2007 field season, crews surveying for bat species richness in Blackwood Canyon and Cookhouse Meadow detected Townsend's big-eared bat (*Corynorhinus townsendii*) via ultrasonic detectors (Borgmann et al. 2007). This species may occur from sea level to over 10,000 feet (summarized in Kunz and Martin 1982, Gellman and Zielinski 1996, Fellers and Pierson 2002). Caves or cave analogues (e.g. abandoned mines and buildings, and lava tubes) are typically used for roosting (Graham 1966, Barbour and Davis 1969, Kunz and Martin 1982) though roosting in tree hollows has been

Townsend's big-eared bat (photo courtesy of Diane Probasco).

reported in coastal California habitats (Gellman and Zielinski 1996, Fellers and Pierson 2002). Roost searches are the most efficient survey method as Townsend's big-eared bats are not readily detected by mist-net or acoustic surveys (Miner and Stokes 2005) and because this species, rather than roosting in crevices like many other species of bat, roosts only out in the open on walls and ceilings where it is easily detected (Pierson and Rainey 1998). Care must be taken near roosts as this species is particularly sensitive to disturbance and may abandon roost sites after even the slightest disturbance (Graham 1966, Barbour and Davis 1969, Pierson and Rainey 1998, Minor and Stokes 2005). No roosts are known on the LTBMU; the nearest known roosts are located over 50 miles from the wildlife analysis area in the Sierra Nevada foothills (Pierson and Rainey 1998). Surveys were not conducted for this project, but two detections of this species (one at Blackwood Canyon and one within the wildlife analysis area at Cookhouse Meadow) are known within the Lake Tahoe basin (Julie Roth – Wildlife Biologist, personal communication 2008). Both caves and mines are scarce in the Lake Tahoe Basin, with undisturbed cave-like buildings (a possible secondary source of maternal roosting habitat) virtually non-existent. Following the detections in 2007, the Forest Service initiated plans to assess mines for bat habitat suitability and conduct protocol surveys where appropriate during 2008.

A short list of known historical mine locations is catalogued in Forest Service records. The short list contains only three sites with affiliated UTM coordinates, while the rest are described by Township and Range to section and quarter. Some, but not all, have been previously photographed. Without precise location information, LTBMU wildlife crews conducted area searches prior to checking mines for possible bat habitat suitability. Mine entrances successfully located were visually inspected from a distance of 15 feet. These pre-surveys were conducted during daylight hours with intent to categorize mines as suitable or unsuitable for cave/mine dwelling bat roosting habitat. Suitability was based on mine entrance size, accessibility, airflow, evidence of internal features, standing water, and visual sign of bat presence, as detailed in Tuttle and Taylor 1998.

Of five total mines located, three were slated for nighttime surveys based on suitability determined in pre-surveys: Tahoe Treasure/Noonchester I and II, as well as Mountain Top. The protocol utilized, based on Tuttle and Taylor 1998, specifies two visits per site between mid-June and early August. Two observers, positioned at least 15 feet from the mine entrance visually surveyed for two and a half hours beginning 30 minutes prior to sunset. Two dim red lights were positioned across the entrance, which aided one biologist in naked eye observation, while the other used night vision binoculars. Surveyors also listened for wing beat sounds. Approximate numbers of individuals detected were tallied and recorded.

1.10.2 RESULTS OF SURVEYS

Positive detection status was obtained at a single site, Tahoe Treasure/Noonchester I. Approximately 6 bats were seen to exit the mine entrance during the first visit on 14 July, 2008. For the second visit, observers returned with a Pettersson Ultrasonic Detector, which yielded approximately 24 individual passes, although only 3 were seen to emerge from the mine. Non-protocol visits were made during the next few weeks in attempt to obtain further proof of bats roosting at Tahoe Treasure. Initially, tarps were laid on the ground in front of the mine entrances and inspected for guano one week later. None appeared on the tarp in front of Tahoe Treasure I, although a small amount was found on the tarp in front of the Tahoe Treasure II entrance. The amount of visible guano on rocks and the ground

Tahoe Treasure/Noonchester II mine, early season. Note water flowing over and through entrance.

around this mine entrance was observed to increase through August and September. Later, biologists returned with a Pettersson/Sonobat set-up, which records ultrasonic bat calls for later analysis. Two visits, based on Tuttle and Taylor 1998 protocol for ultrasonic data collection, recorded bat signature files at Tahoe Treasure I and II. The LTBMU did not complete the requisite number of protocol visits due to late inception of the first two Pettersson surveys and uncertainty over the relevancy of data gather late in the season when most individuals may already have left the area on migration. Data from completed Sonobat surveys will be analyzed during the winter of 2008-09.

1.10.3 DISCUSSION OF RESULTS

Tahoe Treasure I and II mine entrances, though geographically very close together, are characteristically very different. The Tahoe Treasure I adit, approximately 20 feet deep, is located on a hillside and relatively sheltered by trees, thus not subject to katabatic air or high winds and other extremes of weather. Tahoe Treasure II is much deeper, but relatively sheltered by vegetation, and has a seasonal water source flowing through and over the adit and exiting the mine entrance to continue downhill. Most likely spring-fed, this water source eventually dries up over the course of the summer season. During early visits we observed, along with a greater volume of water, cold air exiting the adit. Since bats favor roosting areas that are warmer than outside areas, Tahoe Treasure I would be a more logical roosting choice given the proximity of the two mines. However, the creek exiting Tahoe Treasure II dried up during late summer after protocol surveys were complete. A shift of individuals from one mine to the other as habitat suitability shifted could explain the guano detected at Tahoe Treasure II after no detections during protocol surveys.

Bat populations inhabiting the Lake Tahoe Basin during the breeding season are thought to migrate during September and October (California Wildlife Habitat Relationship System, Volume 8.1, California Fish and Game 2005), presumably depending on local weather conditions and the abundance of invertebrate prey. Due to difficulties with equipment, LTBMU biologists were unable to initiate protocol Sonobat surveys until mid-September. By this time, average nighttime temperatures had dropped significantly, raising the question that many individuals may have left the area in migration already. While a requisite number of protocol surveys could have been completed at this point, a decision was made to hold off this portion of fieldwork until 2009, when surveys could be completed earlier in the season.

1.10.4 MANAGEMENT RECOMMENDATIONS

Based on the paucity of caves and mines in the Tahoe Basin and their importance in the life history of Townsend's big-eared bat, it is essential to protect all potential roosting and maternal habitat for this species in order to conserve their populations in the LTBMU. Mountain Top mine is already slated for destruction, but will go forward only following negative detection status for bats during 2009. The bat grate on Tahoe Treasure/Noonchester II should remain, and a similar device installed on the Tahoe Treasure I entrance in order to minimize disturbance to potential roosting habitat. However, the bat grate at Tahoe Treasure/Noonchester I should follow specifications described in Tuttle and Taylor 1998.

Protocol surveys should continue in 2009, especially those conducted with Sonobat recording equipment, which is capable of detecting Townsend's Big-eared bat specifically, if present.

1.11 MOUNTAIN BEAVER

1.11.1 BACKGROUND, PROTOCOL, AND METHODS

The LTBMU conducted surveys were done during daylight hours to get the most sunlight available when looking for detections. The protocol for mountain beavers was created by Shay Zanetti and Rena Escobedo based on literature. Mountain beaver is a presence absence survey. Presence sign includes hay piles, clipped stems, basal barking and burrows. In order to avoid over estimating the number of territories found, when sign is found, surveyors move up and/or down the drainage 100m before resuming the search based on home range figures. This will avoid the possibility of detecting two areas of sign that are part of the same home range.

1.11.2 SURVEY RESULTS

A report was completed this year but the findings are too extensive to present in this annual summary. In the Benwood Meadow watershed, 2 of 48 surveyed sites had detections of physical sign. The Saxon Creek watershed had 33 of 62 surveyed sites with physical detection in 2008 (Appendix 9 & 10). The full report is found on the LTBMU internal server. Please contact Rena Escobedo at rescobedo@fs.fed.us for a copy. *Recommendations, Mountain Beaver Distribution in the Lake Tahoe Basin, Mountain Beaver Habitat Assessment Report Draft, Escobedo et al., 2008*

1.11.3 DISCUSSION OF SURVEY RESULTS

The Lake Tahoe Basin Management Unit is in the process of developing a basin wide monitoring plan for mountain beaver as part of the Forest Plan Revision. A mountain beaver assessment was completed in the Big Meadow watershed in 2007. Burrow networks of these species were identified in separate drainages within aspen stands and riparian areas in the tributaries along the drainages of the creeks in the watershed during both years surveyed.

1.11.4 MANAGEMENT RECOMMENDATIONS

Survey efforts found mountain beavers in higher, wetter elevations. With the current protocol, reproductive activity and a population estimate is unknown. This is the last year of mountain beaver surveys and any data collected will be submitted to development of a monitoring plan.

2.0 ACKNOWLEDGEMENTS

Wildlife biologists and biological science technicians from the USFS, TRPA, NDOW, EDAW, and Hauge Brueck Associates, resource ecologists from California State Parks, and volunteers conducted the wildlife surveys described in this report. For their assistance in conducting the surveys, we thank: Garth Alling, Melanie Greene, Heather Valentine, Steve Henderson, Silver Hartman, Lisa Fields, David Catalano, Ted Thayer, the TRPA boat crew, Mike Morrison, Kathi Borgmann (and the restoration crew), Heather Mathewson (and the WIFL crew), Will Richardson, Victor Lyon, Raul Sanchez, Julie Roth, Shay Zanetti, Blake Taylor, Ellen Sherrill, Rena Escobedo, Melanie Collins, Alice Croisant, Leslie Farnham, Kristina Moreno, Hannah Pruett, Adrian Escobedo and Generation Green, our volunteers, and all those who helped.

3.0 REFERENCES

Barbour, R.W. and W.H. Davis. 1969. Bats of America. Univ. Press, Kentucky, Lexington, 286pp.

Bradley, P.V., M.J. O'Farrell, J.A. Williams, and J.E. Newmark, editors. 2006. The revised Nevada bat Conservation plan. Nevada Bat Working Group. Reno, Nevada.

Brown, L. N. 1967. Seasonal activity patterns and breeding of the western jumping mouse (*Zapus princeps*) in Wyoming. American Midland Naturalist 78:460-470.

Brown, L. N. 1970. *Population dynamics of the western jumping mouse (Zapus princeps*) during a four-year study. Journal of Mammalogy 51:651-658.

Bombay, et.al. 2003. A Willow Flycatcher Survey Protocol.

Borgmann, K.L., J. Groce, and M.L. Morrison. 2007. Lake Tahoe Basin Management Unit Restoration Project Monitoring Report, Chap V.

Burger, J. 1988. Social attraction in nesting least terns: effects of numbers, spacing, and pair bonds. Condor 90:575-582.

California Department of Fish and Game. 2005. California Wildlife Habitat Relationship System 8.1.

Dark, S.J., R. J. Gutiérrez, and G.I. Gould, Jr. 1998. The Barred Owl (Strix varia) Invasion in California. The Auk 115:50-56.

DeByle, N. V. and R.P Winkours, editors. 1985. Aspen: ecology and management in the western United States. United States Forest Service GTR-RM-119:135-152.

Graham, R.E. 1966. Observations on the roosting habits of the big-eared bat, *Plecotus townsendii*, in California limestone caves. Cave Notes, 8:17-22.

Gellman, S.T. and W.J. Zielinski. 1996. Use by bats of old-growth redwood hollows on the north coast of California. Journal of Mammology, 77(1):255-265.

Flack, J. A. D. 1976. Bird populations of aspen forest in western North America. Ornithological Monographs 19:1–97.

Fellers, G.M. and E. D. Peirson. 2002. Habitat use and foraging behavior of Townsend's big-eared bat (*Corynorhinus townsendii*) in coastal California. Journal of Mammalogy, 83(1):167-177.

Forsman, E.D. 1980. Habitat Utilization by Spotted Owls in the West Central Cascades of Oregon. Ph. D. diss. Oregon State University, Corvallis.

Hahn, B.A. and E. D. Silverman. 2007. Managing breeding forest songbirds with conspecific song playbacks, Animal Conservation 10:436-441.

Heavenly Ski Resort. 1996. Heavenly Ski Resort Master Plan.

Kelly, E.G., E.D. Forsman, and R.G. Anthony. 2003. Are Barred Owls Displacing Spotted Owls? The Condor 105:45-53.

Kunz, T.H. and R.A. Martin. 1982. *Plecotus townsendii*. Mammalian Species 175:1-6.

McGarigal, K. and J.D. Fraser. 1985. Barred Owl Responses to Recorded Vocalizations. The Condor 87:552-553

Mathewson, H. A., H. L. Loffland, M.L. Morrison. 2006. Annual Report and Preliminary Demographic Analysis for Willow Flycatcher Monitoring in the Central Sierra Nevada.

Miner, K.L. and D.C. Stokes. 2005. Bats in the south coast ecoregion: status, conservation issues, and research needs. *In* USDA Forest Service, Gen. Tech. Rep. PSW-GTR-195. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture; pp. 211-227.

North, M. G. Steger, R. Denton, G. Eberlein, T. Munton, K. Johnson. 2000. Association of Weather and Nest-Site Structure with Reproductive Success in California. J. Wildl. Manage. 64:797-807.

Olson, G.S., R.G. Anthony; E.D. Forsman, S.H. Ackers, P.J. Loschl, J.A. Reid, K.M. Dugger, E.M. Glenn, and W.J. Ripple 2005. Modeling of Site Occupancy Dynamics for Northern Spotted Owls, with Emphasis on the Effects of Barred Owls, The Journal of Wildlife Management 69:918-932.

Page, J.E. Protocol for Observing Known Peregrine Falcon Eyries in the Pacific Northwest. USFS Internal Document.

Pierson, E.D. and W.E. Rainey. 1998. Distribution, status, and management of Townsend's big-eared bat (*Corynorhinus townsendii*) in California. Wildlife Management Division Bird and Mammal Conservation Program Final Report for Contract No. FG7129. California Dept. Fish and Game. 34 pp.

Reid, J.A., R.B. Horn, and E.D. Forsman. 1999. Detection Rates of Spotted Owls Based on Acoustic-Lure and Live-Lure Surveys, Wildlife Society Bulletin 27:986-990.

Salt, G. W. 1957. Analysis of avifaunas in the Teton Mountains and Jackson Hole, Wyoming. Condor 82:373–393.

Seamans, M.E., R.J. Gutierrez, C.A. Moen, M.. Peery. 2001. Spotted Owl Demography in the Central Sierra Nevada. J. Wildl. Manage. 65:425-431.

Steenhof, K. 2003. Midwinter Bald Eagle Surveys. http://srfs.wr.usgs.gov/midwinte.htm

Tahoe Regional Planning Agency. 2000. Wetland Threshold Survey Protocol, Draft.

Tahoe Regional Planning Agency. 2000. Tahoe Regional Planning Agency Osprey Survey Protocol.

Tahoe Regional Planning Agency. 1987. Regional Plan for the Lake Tahoe Basin: Code of Ordinances: 2-29.

Tahoe Regional Planning Agency. 1982. Environmental Thresholds Carrying Capacities for the Lake Tahoe Regional Planning Agency.

Tahoe Regional Planning Agency. 1982. Tahoe Regional Planning Agency's Goals and Policies.

United States Department of Agriculture (USDA). 2000. Lake Tahoe Watershed Assessment Vol. 1:499 501.

United State Department of Agriculture (USDA). 1995. Forest Service Manual 2670.5.

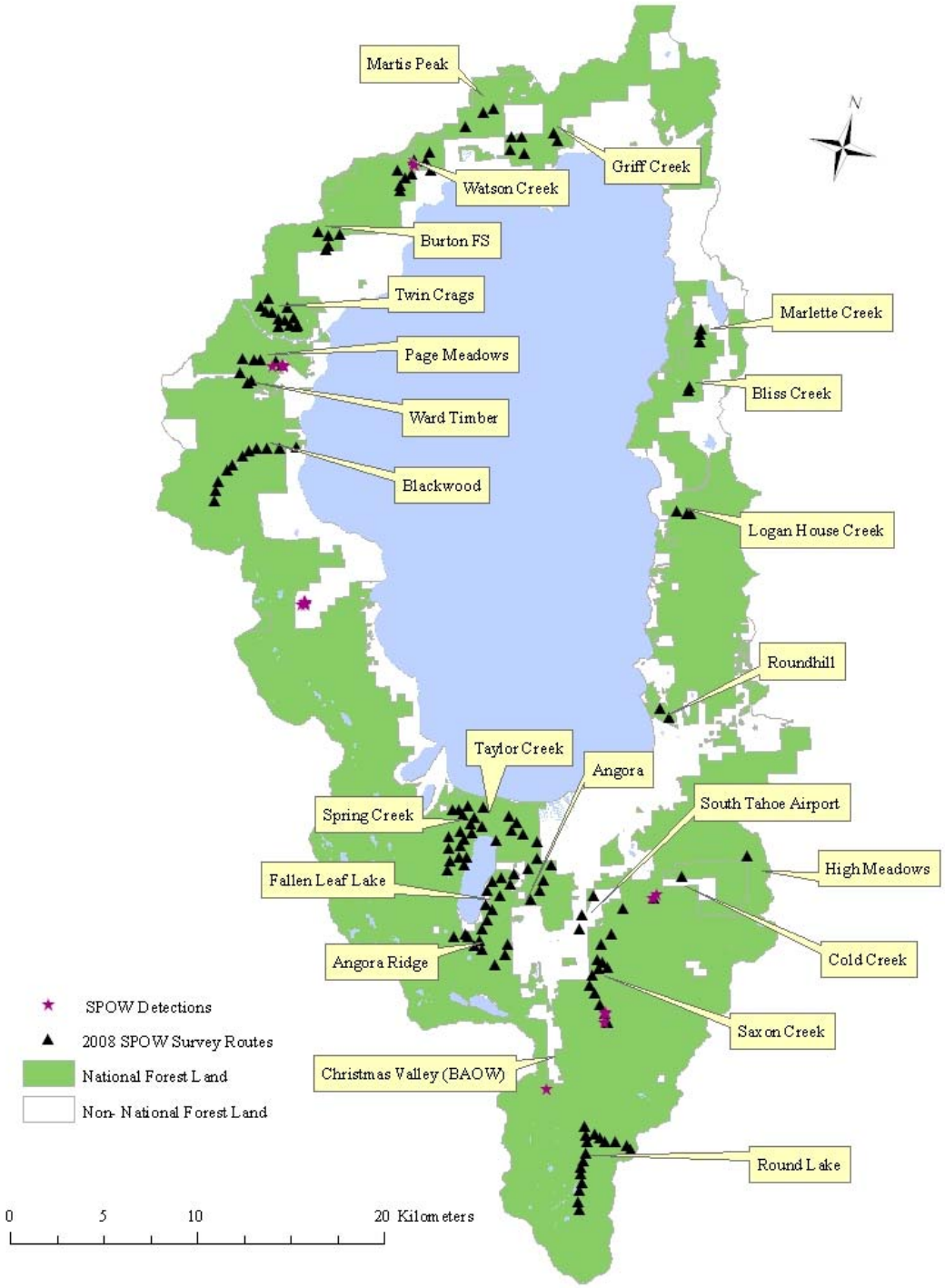
United States Department of Agriculture (USDA). 1991. Protocol for Surveying for Spotted Owl in Proposed Management Activity Areas and Habitat Conservation Areas.

United States Department of Agriculture (USDA). 1988. Land and Resource Management Plan: Lake Tahoe Basin Management Unit. S. Lake Tahoe, CA.

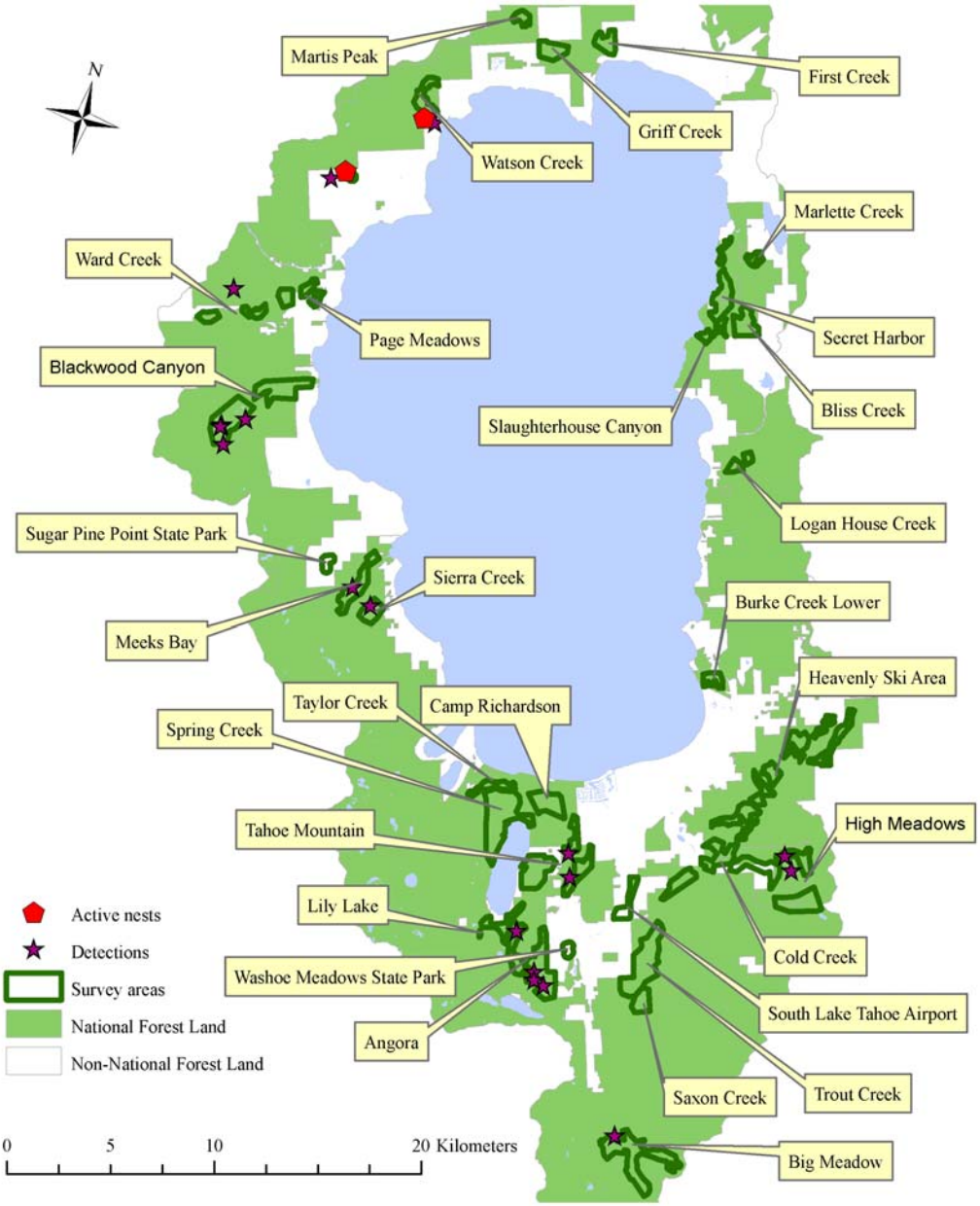
Verner, J, S. Kevin, B.R. Noon, R.J. Gutierrez, G.I Gould, Jr., and T.W. Beck, technical coordinators. 1992. The California spotted owl: a technical assessment of its current status. Gen. Tech. Rep. PSW-GTR-133. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture: 285.

Woodbridge, B., Hargis, C.D. 2006. Northern goshawk inventory and monitoring technical guide. Gen. Tech. Rep. WO-71. Washington, DC: U.S. Department of Agriculture, Forest Service.

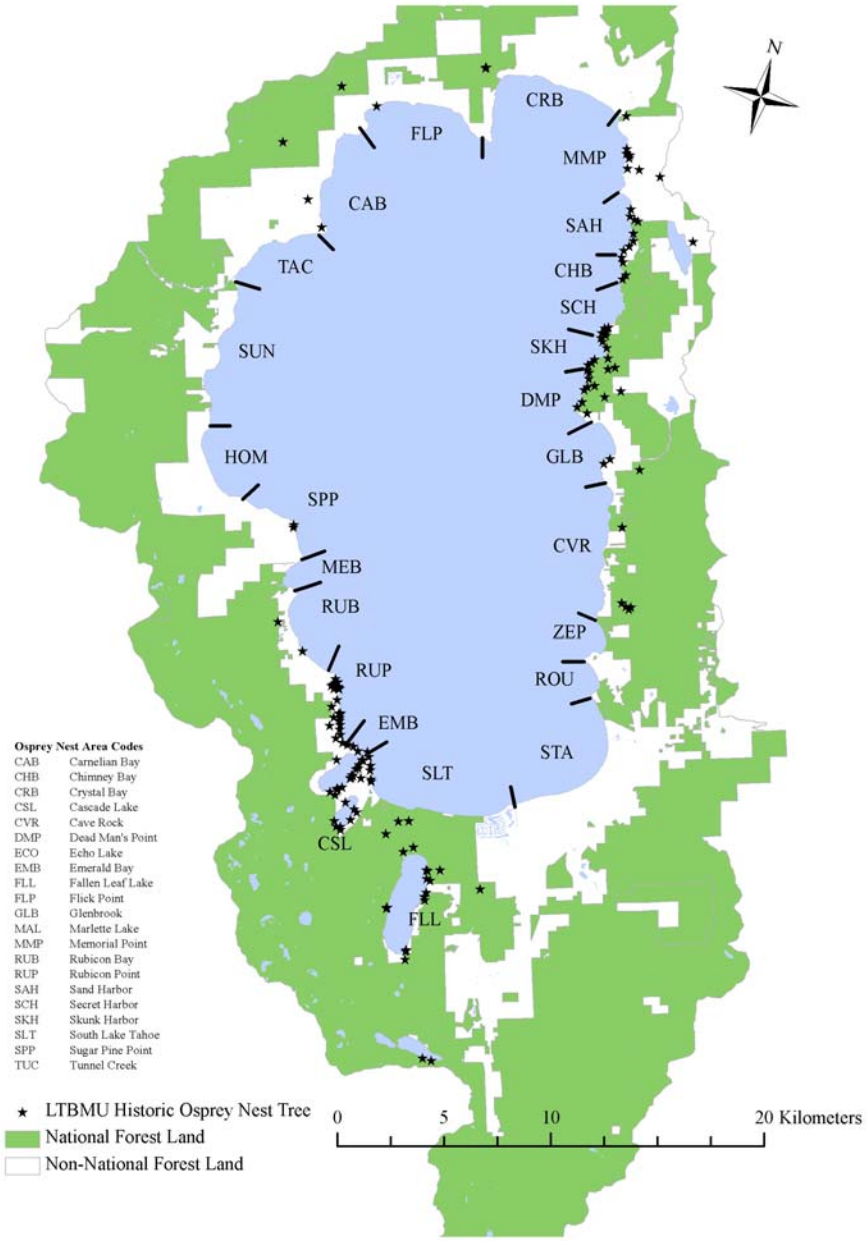
Appendix 1. Locations of California spotted owl survey call stations and nest stand habitat surveys within the Lake Tahoe Basin, 2007. Surveys conducted by Lake Tahoe Basin Management Unit, California State Parks, Nevada Division of Wildlife, and Hauge Brueck Associates.



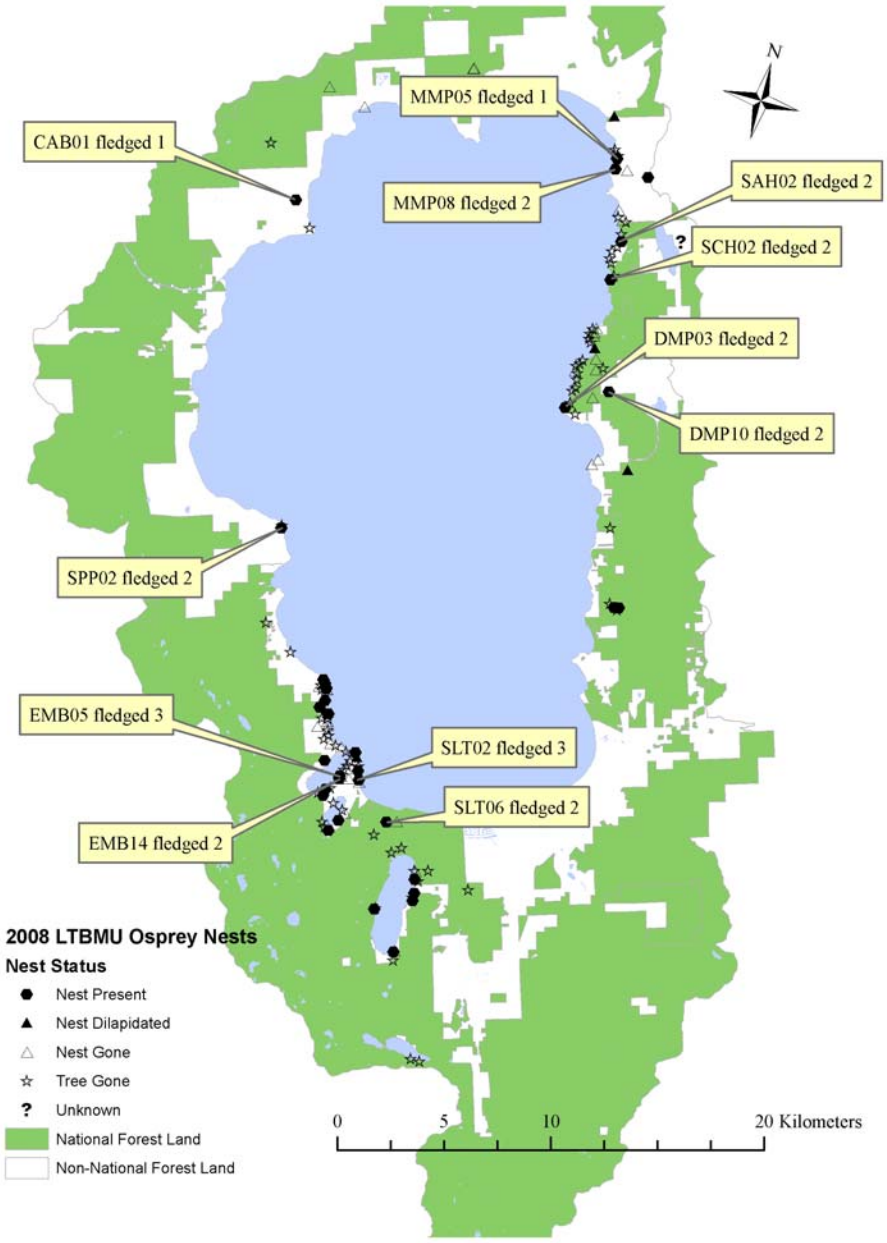
Appendix 2. Locations of northern goshawk survey polygons within the Lake Tahoe Basin, 2008. Surveys conducted by Lake Tahoe Basin Management Unit, California Department of Parks and Recreation, Nevada Department of Wildlife, and Hauge Brueck Associates.



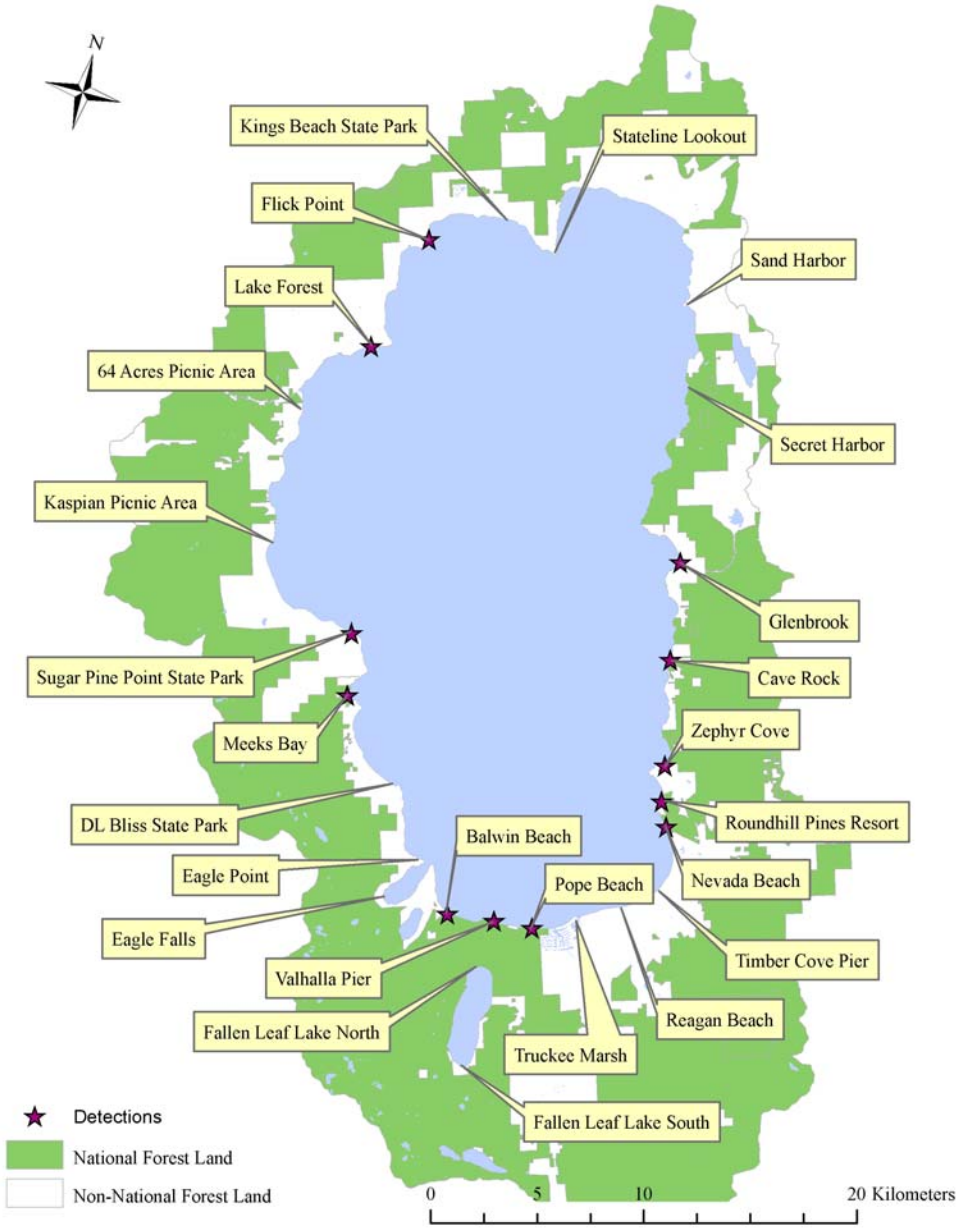
Appendix 3. Area surveyed by the Lake Tahoe Basin Management Unit, Tahoe Regional Planning Agency, Nevada Department of Wildlife, and California Department of Parks and Recreation to assess the spatial location and reproductive activity of osprey in the Lake Tahoe Basin, 2008



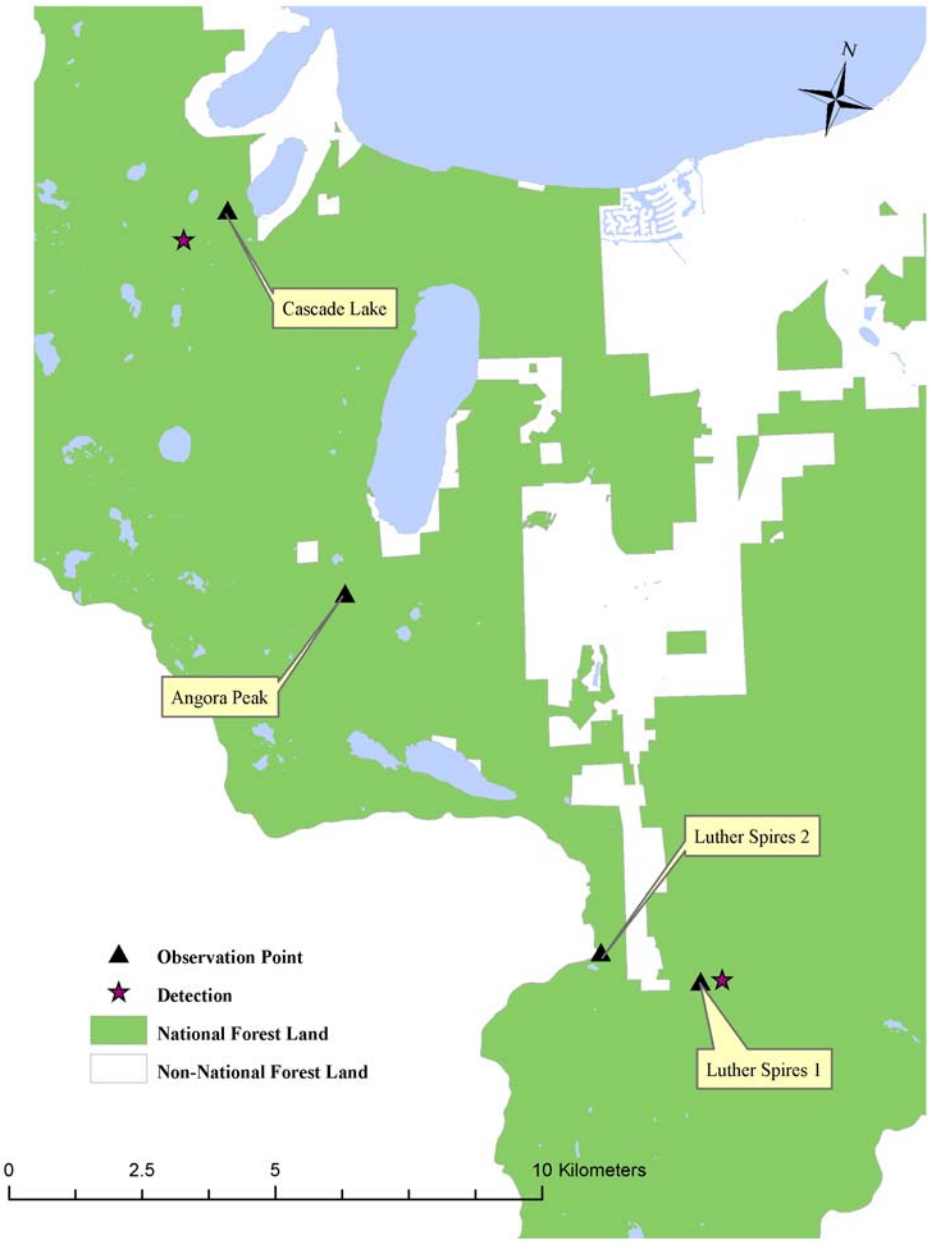
Appendix 4. Osprey nest activity and reproductive success detected in the Lake Tahoe Basin by the Lake Tahoe Basin Management Unit, Tahoe Regional Planning Agency, Nevada Department of Wildlife, and California Department of Parks and Recreation in 2008.



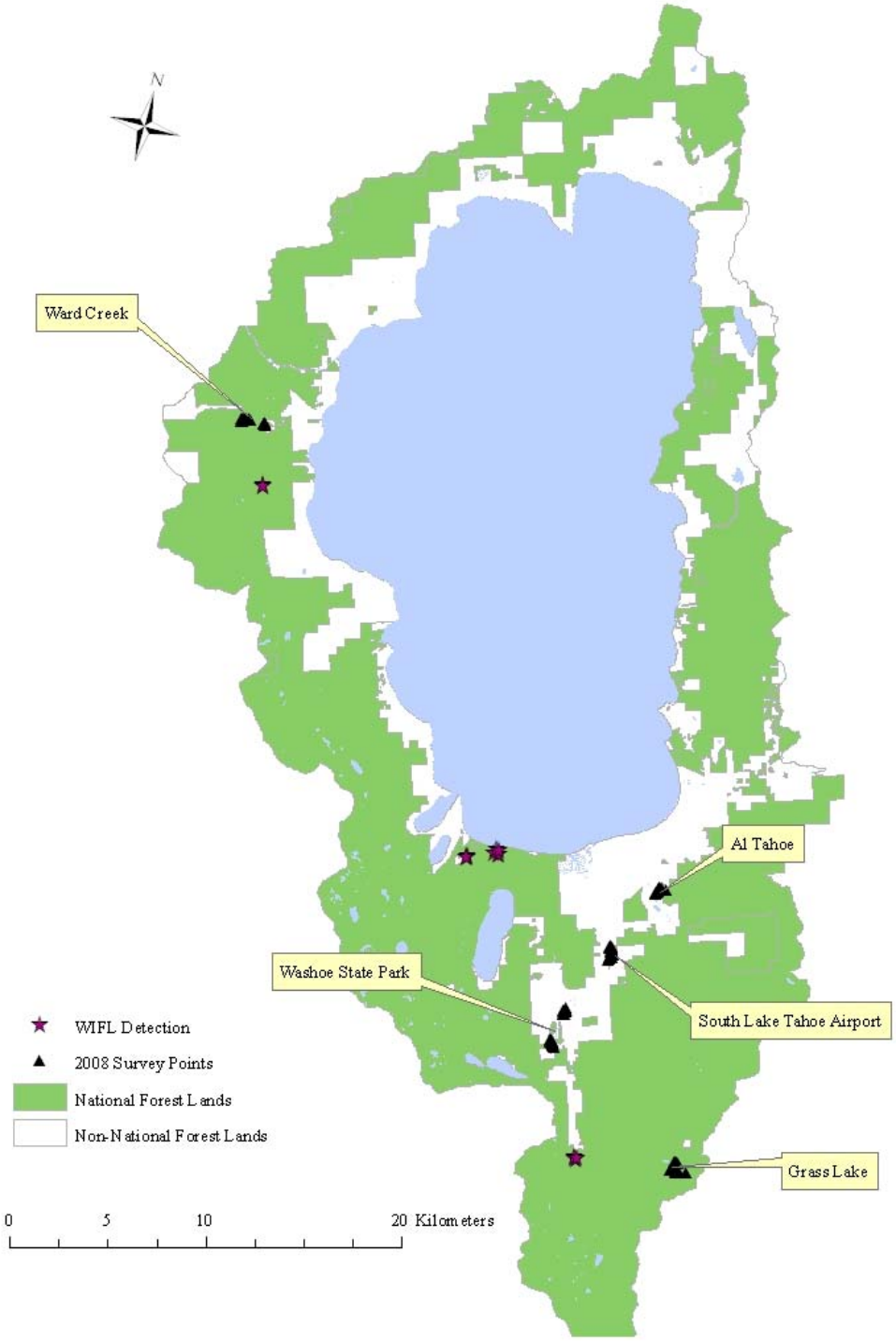
Appendix 5. Area surveyed for bald eagle nests, locations of mid-winter bald eagle count observers, and locations of bald eagles detected during the mid-winter count, 2008. Surveys for bald eagle nests and the mid-winter bald eagle count were conducted by the Lake Tahoe Basin Management Unit and its partners.



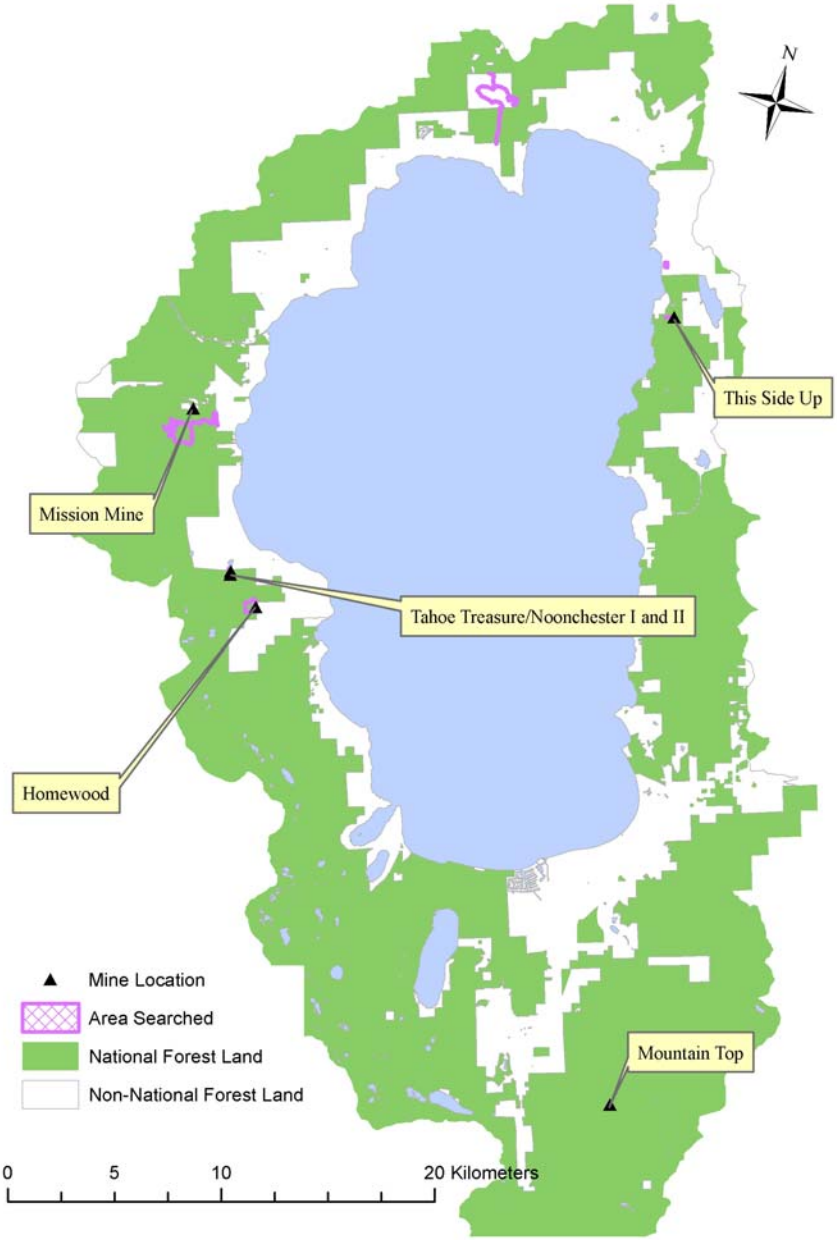
Appendix 6. Peregrine falcon survey locations and detections by Lake Tahoe Basin Management Unit wildlife crews in 2008.



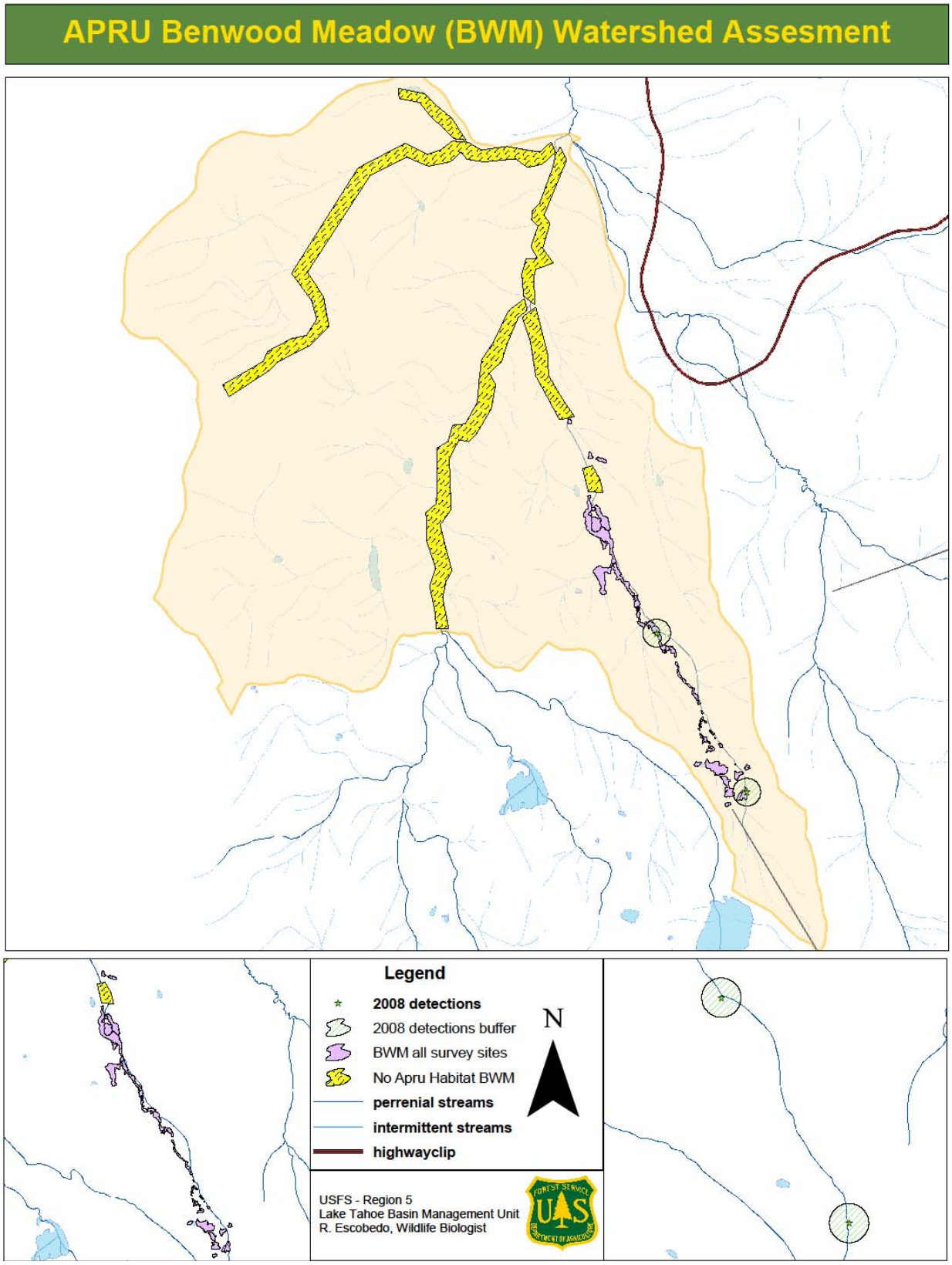
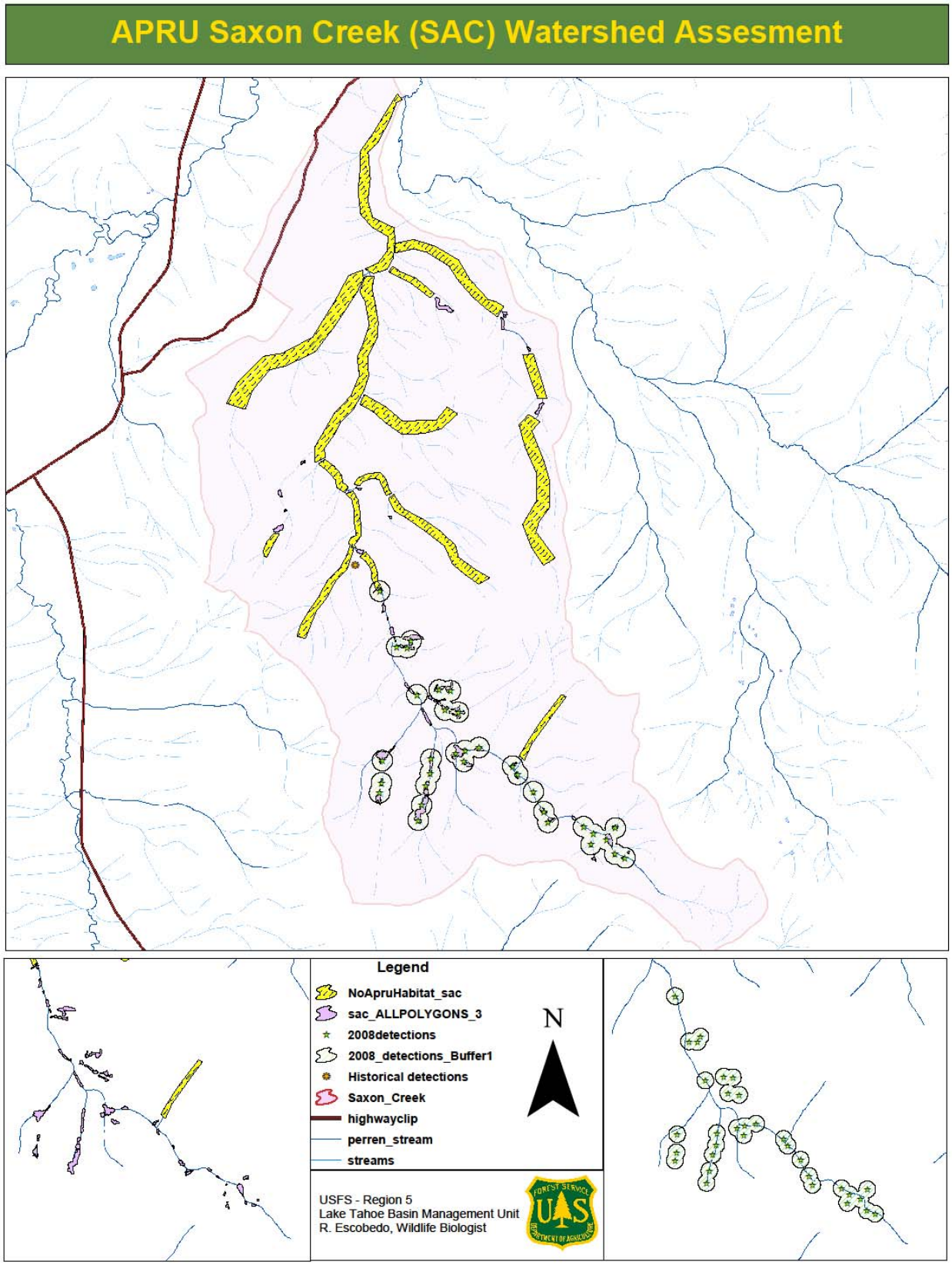
Appendix 7. Locations surveyed to determine willow flycatcher presence or probable absence and reproductive activity by the Lake Tahoe Basin Management Unit and its partners, 2008.



Appendix 8. Locations of mines inspected for bat habitat suitability and areas searched for mines by Lake Tahoe Basin Management Unit wildlife crew personnel in 2008.



Appendix 9. Mountain beaver presence detections found in the Benwood Meadow watershed in 2008.



Appendix 10. Mountain beaver presence detections found in the Saxon Creek watershed in 2008.